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ENGINEERING DESIGN FILE

Project/Task OU 4-12 RI/FS

Subtask Source Term Investigation

EDF Page 1 of 126

TITLE: CFA Landfills II and III; Disposal of Construction Debris

SUMMARY

The summary briefly defines the problem or activity to be addressed in the EDF, gives a summary of the activities performed in addressing the problem and states the conclusions, recommendations, or results arrived at from this task.

Attachments 1 through 16 include references to disposal of construction debris to CFA Landfill II and III.

Attachment 1:
Subject: Draft Environmental Statement on NRF Waste Management
Date: October, 1973

Attachment 2:
Subject: Environmental Assessment, Dismantling and Removal of the Army Re-entry Vehicle Facility Site (ARVFS)
Date: September 2, 1977

Attachment 3:
Subject: Environmental Assessment, CF-662 Cafeteria Window Replacement
Date: September 2, 1977
Content: Solid, nonradioactive waste in the form of construction debris was disposed to CFA Landfill II.

Attachment 4:
Subject: Environmental Assessment, CF-662 Receiving and Inspection Facility
Date: September 2, 1977
Content: Solid, nonradioactive waste in the form of construction debris was disposed to CFA Landfill II (see Section 3.a).

Attachment 5:
Subject: Environmental Assessment, LOFT Closed Loop Treated Water Cooling System.
Date: September 2, 1977
Content: Solid, nonradioactive waste in the form of construction debris was disposed to CFA Landfill II (see Section 3.a).

Attachment 6:
Subject: Environmental Assessment, Dismantling and Removal of the Material Testing Reactor (MTR)
Date: September 2, 1977
Content: Solid, nonradioactive waste in the form of construction debris was disposed of CFA Landfill II (see Section 3.b).

Attachment 7:
Subject: Environmental Assessment, Demolition and Removal of the Auxiliary Reactor Area IV (ARA IV)
Date: August 30, 1977
Content: Solid, nonradioactive waste in the form of construction debris was disposed to CFA Landfill II (see Section 3.b).

Attachment 8:
Subject: Environmental Assessment, Demolition and Removal of the Borax V Facility.
Date: August 29, 1977
Content: Solid, nonradioactive waste in the form of construction debris was disposed to CFA Landfill II (see Section 3.b).

Attachment 9:
Subject: Environmental Assessment, Demolition and Removal of the Initial Engine Test (IET)
Date: August 29, 1977
Content: Solid, nonradioactive waste in the form of construction debris was disposed to CFA Landfill II (see Section 3.b).

Attachment 10:
Subject: Environmental Assessment, Decontamination of the Hallam Reactor Components
Date: August 24, 1977
Content: Solid, nonradioactive waste in the form of construction debris was disposed to CFA Landfill II (see Section 3.b).

Attachment 11:
Subject: Environmental Assessment, Dismantling and Demolition of the Organic Moderated Reactor Experiment (ORME)
Date: August 23, 1977
Content: Solid, nonradioactive waste in the form of construction debris was disposed to CFA Landfill II (see Section 2.b).

Attachment 12:
Subject: Environmental Assessment, Dismantling and Decontamination of the TAN Radioactive Waste Evaporation System
Date: August 25, 1977
Content: Solid, nonradioactive waste in the form of construction debris was disposed to CFA Landfill II (see Section 3.b).

Attachment 13:
Subject: Environmental Assessment, CF-688 Modifications
Date: August 25, 1977
Content: Solid, nonradioactive waste in the form of construction debris was disposed to CFA Landfill II (see Section 3.b).

Attachment 14:
Subject: Environmental Assessment, Electrical Power Upgrade at CF-688.
Date: August 26, 1977
Content: Solid, nonradioactive waste in the form of construction debris was disposed to CFA Landfill II (see Section 3.b).

Attachment 15:
Subject: Environmental Assessment, CF-689 Modifications for Instrumentation and Control Lab.
Date: August 8, 1977
Content: Solid, nonradioactive waste in the form of construction debris was disposed to CFA Landfill II (see Section 3.b).

Attachment 16:
Subject: Environmental Assessment, CF-671 Steam Line Replacement
Date: August 4, 1977
Content: Solid, nonradioactive waste in the form of construction debris was disposed to CFA Landfill II (see Section 3.b).

Distribution (complete package):

Distribution (summary page only):

Author Dept.	Reviewed Date	Approved Date
Stacey K. McCormick ER-WAG4	N/A	N/A
n/a	EG&G Review Date V. Watson 9-8-94	EG&G Approval Date T R Pigott 9/9/94

Attachment 1

Subject: Draft Environmental Statement on NRF Waste Management

Date: October, 1973

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DRAFT ENVIRONMENTAL STATEMENT
ON NRF WASTE MANAGEMENT

October, 1973

10.1.1

DRAFT ENVIRONMENTAL STATEMENT
ON NRF WASTE MANAGEMENT

October, 1973

I. Summary

The fact that potentially dangerous radioactive materials are an inherent byproduct of the nuclear fission process makes the proper control of site operations a matter of environmental concern. This concern was recognized at the inception of operations at NRF and all features of design, construction, operation, maintenance and personnel selection, training and qualification have been oriented towards minimizing environmental effects.

In particular, these features have been fully implemented in NRF waste management. As a result, releases of radioactivity have been controlled and small, and have had no significant effect on the levels of radioactivity at and around the Facility. Waste management systems have been upgraded to incorporate improved technology. In 1973 the total radioactivity released in liquids was <0.001 Ci and the total airborne particulate activity release was <0.001 Ci.

This report first describes the Naval Reactors Facility, discusses liquid and solid radioactive waste management, airborne radioactivity control and then describes industrial and sewage treatment methods. It is concluded that operation of the Facility has had no effect on the quality of the environment.

II. Description of Naval Reactors Facility

The Naval Reactors Facility (NRF) consists of an 80-acre site on which are located three operating naval reactor prototypes and the Expended Core Facility, plus all necessary administrative and support functions. The Facility is operated by the Westinghouse Electric Corporation for the U. S. Atomic Energy Commission.

The S1W reactor plant, originally the prototype for the nuclear-powered submarine NAUTILUS, has been in operation since 1953 and was the first reactor plant constructed at NRF. S1W presently is used to test advanced naval nuclear reactors and nuclear reactor components and to train U. S. Navy personnel for service in the nuclear Navy.

The A1W reactor plant is the prototype for the aircraft carrier ENTERPRISE. It has been in operation since 1959. A1W is a two-reactor plant in which two advanced naval cores are installed and operating. The A1W plant is also used to train Navy personnel.

The S5G reactor plant, the newest of the NRF plants, became operational in 1966. S5G is the prototype of the "silent" submarine in which water flow through the nuclear reactor will be caused by thermal circulation rather than by pumps. The plant was designed, constructed, and operated by the General Electric Company until 1972, when the Westinghouse Electric Corporation became responsible for its operation. This plant is also used to train Navy personnel.

The Expended Core Facility (ECF), which became operational in 1958, is a large facility for examining, measuring, and testing components that have been irradiated in nuclear reactors. In this facility, structural material from expended naval core fuel modules is removed. After separation, the structural parts are shipped to the burial ground at the National Reactor Testing Station for disposition, and the expended fuel is transferred to the Idaho Chemical Processing Plant for reprocessing and recovery of fissile material.

III. Radioactive Waste Management

A. Liquid

The principal source of radioactivity in wastes from NRF pressurized water reactor prototypes is from trace amounts of neutron-activated corrosion and wear products. These products originate from plant metal surfaces such as valve assemblies which are in direct contact with reactor coolant water. Radionuclides in these corrosion and wear products with half lives greater than one day include chromium-51, manganese-54, iron-55, iron-59, cobalt-58, cobalt-60, zirconium-95, antimony-125, hafnium-181, tantalum-182, and tungsten-187. The predominant and also the longest-lived of these radionuclides is cobalt-60, which has a 5.25 year half-life.

The reactor coolant also contains short-lived radionuclides with half-lives of seconds to hours. The highest concentrations in reactor coolant are from nitrogen-16 (7-second half-life), nitrogen-12 (10 minute half-life), fluorine-18 (1.8-hour half-life), argon-41 (1.8 half-life), and manganese-56 (2.6 hour half-life). For the longest lived of these, the concentration is reduced to one-thousandth of the initial concentration about one day after transfer from the operating plant to the radioactive waste processing system, and the concentration is reduced to one-millionth in about two days. Because of their small amounts and rapid decay, short-lived radionuclides are insignificant compared to long-lived radioauclides for waste disposal considerations, and they will normally disappear during tank holdup of waste for processing.

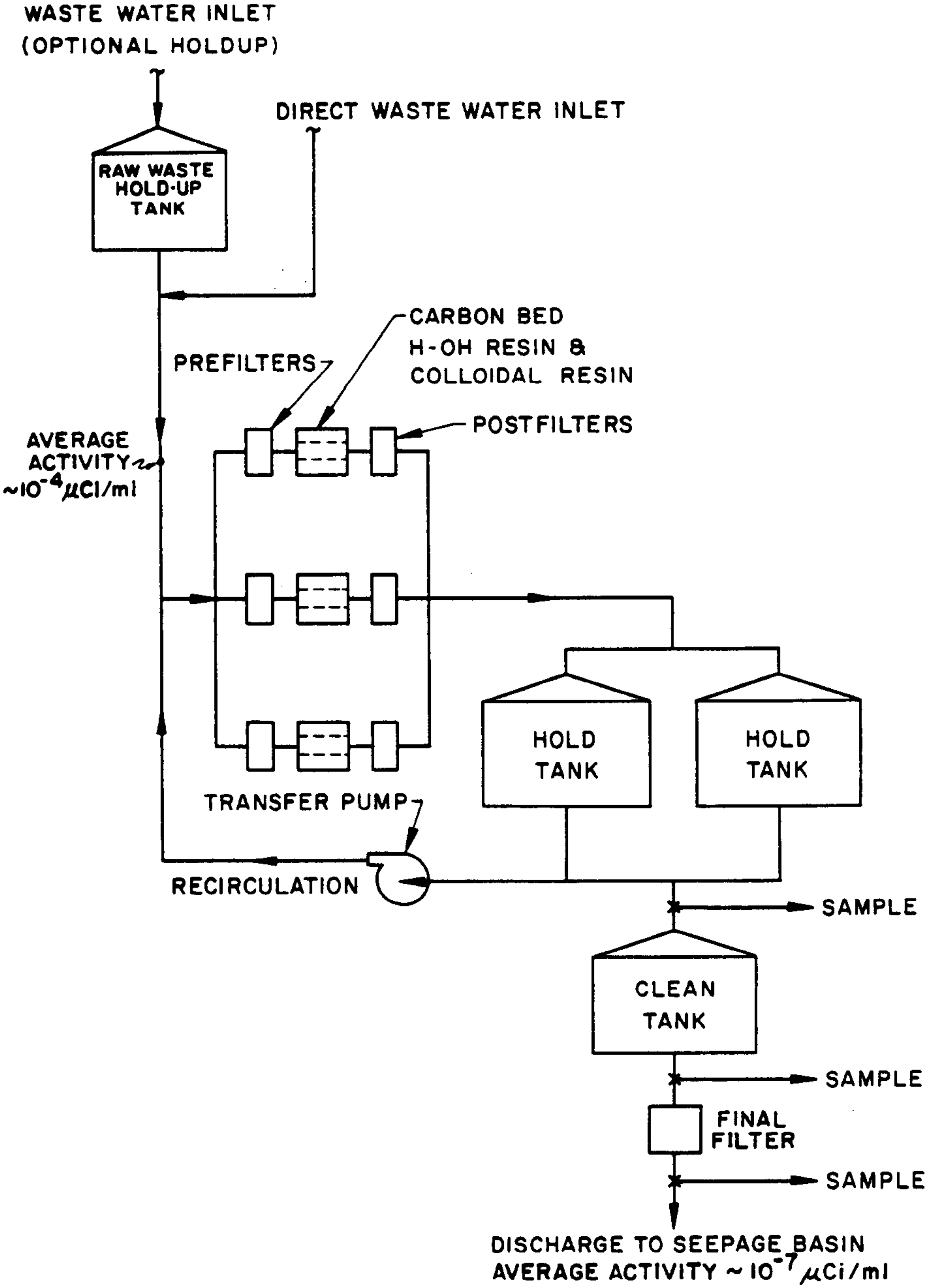
Fission products, including radioactive isotopes of krypton and xenon, are retained within the cladding of Naval fuel elements. Naval Reactor fuel elements are thoroughly tested to confirm their ability to maintain integrity under operating and accident conditions under the effects of radiation. On the basis of these tests and the past successful operation of naval reactor cores, fuel element defects which could release significant fission product radioactivity to the coolant are not expected. However, fission products do appear in NRF prototype reactor coolant following fission of the natural uranium impurity in the Zircaloy fuel cladding. The impurity level of natural uranium in Zircaloy is about one part per million. The concentration in the reactor coolant of fission products from the uranium impurity is so low that the total radioactivity caused by the long-lived fission product radionuclides strontium-90 and cesium-137 is small in comparison with the radionuclides from corrosion and wear products. During prototype reactor operation, daily monitoring of radioactivity in reactor coolant establishes that the low concentrations expected are not exceeded. These data show no significant fission products in the reactor coolant which could occur if fuel element defects existed in the prototype reactor core. These data also confirm the effectiveness of the fabrication methods, quality control, and the extensive fuel element inspection processes used in naval reactor prototypes. In the unlikely event that defects in fuel elements should ever occur, additional fission product radioactivities could be released to the coolant. However, the NRF radioactive waste processing systems are designed with sufficient storage and processing capacity to reduce such activities to the low levels which are consistent with established release limits.

Small amounts of tritium (12-year half-life) are formed in the reactor coolant system, principally from neutron interaction with the naturally occurring deuterium present in water, approximately 0.015 percent. Tritium is also produced in small quantities within the fuel element as a natural result of the fissioning process, but it is prevented from escape to the coolant water by the fuel element cladding material. The tritium is mainly combined in the oxide form and is chemically indistinguishable from hydrogen in water; therefore, tritium does not concentrate significantly in wildlife or collect on stream bottoms. Despite its long half-life, tritium is of less concern in the environment than the cobalt-60 previously discussed, since tritium produces low-energy radiation and is not concentrated biologically. As a result, the radioactivity concentration guide listed in 10CFR20 (Reference 1) is one-hundred times higher for tritium than for cobalt-60. Tritium is also a natural-occurring radionuclide in the environment. It is produced by cosmic-ray interactions with nitrogen and oxygen in the upper portion of the atmosphere. An annual worldwide production rate of 4 to 8 million curies of tritium from this natural source is reported in Reference 2.

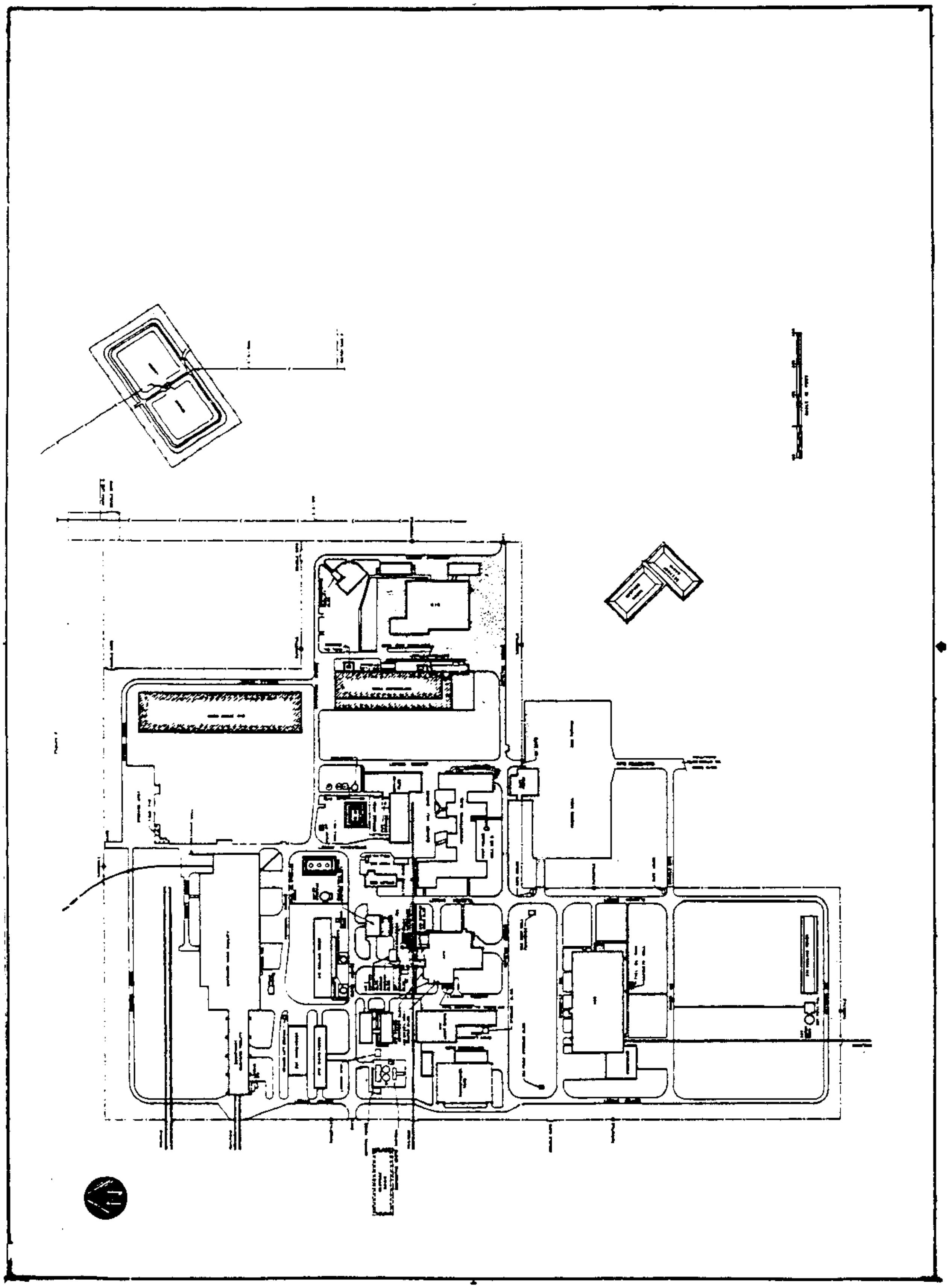
1. Description of Liquid Waste Management System

NRF restricts the discharge of significant waterborne radioactivity to the environment by operating a separate processing system in each of the four facilities. A typical improved prototype processing system is shown in the simplified block diagram of Figure 1. These improved systems were installed in S1W, A1W and S5G in 1971, and their operation reduces radioactivity concentrations in waste effluents to minimum practicable levels. The effluents are discharged after treatment to the two seepage basins shown in the site plan in Figure 2. In 1973 the total radioactivity released in liquid effluent was less than 0.001 curie with an average radioactivity concentration of about 3.3×10^{-7} μCi/ml. To minimize radioactive releases in liquids to levels which are as "low as practicable," NRF waste management systems incorporates the principal features listed below. The average release concentration meets the stringent release criterion for an unidentified radionuclide to a controlled area as specified in Annex A, Note 2B of Reference 1.

(a) In these reactor plant systems, the discharged waste water is processed directly through a series of filters and ion-exchangers and into holding tanks. The filters are both activated charcoal and standard cartridge filters. The



TYPICAL NRF LIQUID RADIOACTIVE WASTE PROCESSING SYSTEM



ion exchange media consist of various types of resins for removal of soluble radioactivity. Each system has a preprocessing storage tank that can be used in the unlikely event that the volume of water to be processed exceeds the capabilities of the system.

(b) After processing and transfer to the hold tank, a sample is drawn and analyzed to determine if its radioactivity concentration is below the release limit of 1×10^{-6} $\mu Ci/cm^3$. If the sample meets the specification, then the water is transferred to the "clean" tank; otherwise, the solution is reprocessed until it meets the release specification.

(c) In order to begin release of the water from the clean tank, a sample must be drawn, analyzed, and still be below the release limit.

(d) Administrative control requires that cognizant management must approve the release in writing only after the results of the "clean" tank sample are examined.

(e) Samples are taken during release, downstream of the final filter, to assure that the radioactive concentration is still below specification, and to obtain a representative sample for final analysis.

(f) If any of these samples is above specification, the release is stopped immediately.

The processed water is released to one of the two seepage basins shown in Figure 2. The basins, which are fenced to prevent entry by wildlife, are pits dug in the earth and either rock-covered or dirt and rock-covered.

A similar waste processing system was installed in 1972 at ECF, except that the processed effluent is reused in ECF operations. Water is continually processed through Celite filter cakes and passed through ion exchange resins for soluble activity removal. Some of this water is then processed through another H-OH resin, a final filter, and then to the reuse tank where it is available for reuse in ECF operations. Operation with this system has enabled making no liquid waste discharges from the Expended Core Facility in 1973. Figure 3 shows the significant reductions in the volume and radioactivity in liquids released in recent years.

2. Environmental Effect of Radioactive Liquid Release

Processed radioactive wastes are directed to the seepage basins shown in Figure 2, which are adjacent to the NRF site. The general character of the wastes is that of filtered, deionized water with a radioactivity content less than 1×10^{-6} μCi/ml gross activity. Table 1 shows a typical distribution of measured activity in prototype releases in a recent year. The release of tritium has been excluded from the average, since its effect on the quality of the human environment is not significant. Cobalt-60 is the principal radioactive isotope identified in this liquid, and the release specification conservatively requires that the gross radioactivity be a factor of three below the permissible concentration of insoluble cobalt-60 to an unrestricted area (Reference 1). A summary of the annual releases of radioactive liquids since calendar year 1952 is given in Table 2.

The environmental effect of releasing liquid to the seepage basin is localized to the rock-covered basin. The rock covering restricts the release of airborne radioactivity when liquid evaporates naturally from the basin. Table 2 indicates that about 344 curies have been released to NRF seepage basins since 1952, and it is estimated that there are approximately 165 curies remaining in the basins after accounting for decay of the released activity. Access by personnel or wildlife to the basins is restricted by a fence surrounding the basin to reduce potential environmental effects further.

Table 1

Measured* Distribution of Activity Released to Seepage Basins

Nuclide	Fraction (%)
Ce-144	1.2
Co-58	0.9
Co-60	67.4
Cs-134	5.9
Cs-137	9.5
Mn-54	0.2
Sb-125	0.5
Sr-89 and Sr-90	2.1
Unidentified β-γ	12.4

*Data obtained from NRF liquid waste for calendar year 1972 reported by NRTS Waste Management Information System. Trace amounts (<0.01%) of Ag-110m, Fe-59 and Hf-181 and unidentified alpha were also detected.

Table 2

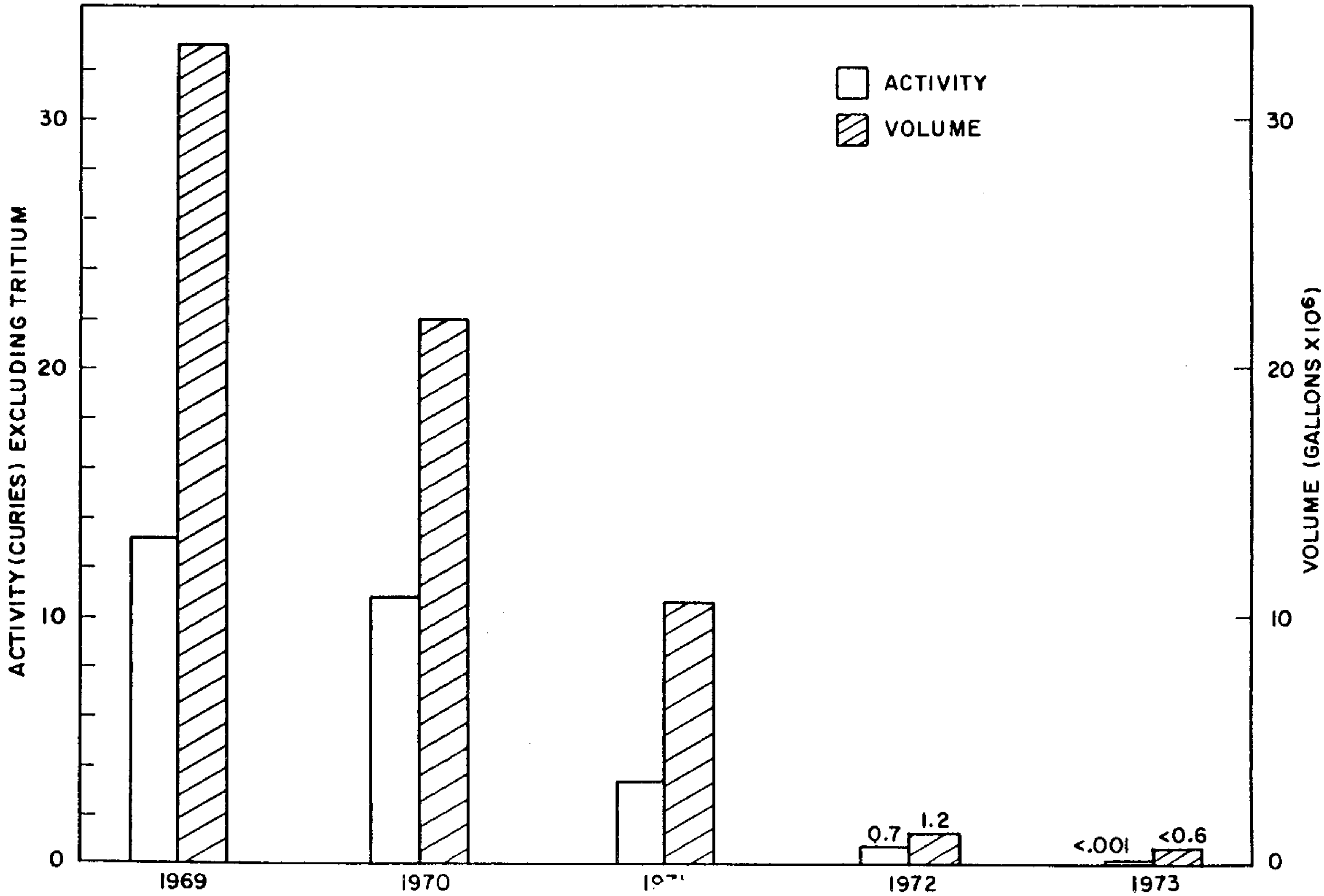
Annual Release of Radioactivity* in Liquids To NRF Seepage Basins

Year	Volume (Liters x 10^6)	Activity (Including Tritium) (Curies)
1952	-	-
1953	10	1
1954	38	1
1955	36	5
1956	41	3
1957	46	5
1958	54	31
1959	64	9
1960	85	31
1961	93	31
1962	106	41
1963	103	57
1964	103	32
1965	125	25
1966	140	18
1967	133	9
1968	144	13
1969	117	16
1970	76	12
1971	40	4
1972	5	0.7
TOTAL	1559	344

*Data obtained from AEC-ID 1972 Waste Management Information System report which includes a summary of information reported since 1952.

NRF LIQUID RADIOACTIVE WASTE RELEASES
(TOTAL ACTIVITY) (EXCLUDING TRITIUM)
1969-1973 PERFORMANCE
REFERENCE: NRTS RADIOACTIVE WASTE MANAGEMENT INFORMATION SYSTEM

Figure 3



B. Solid

1. Solid Radioactive Waste Management

Solid radioactive waste materials generated during training, maintenance, and overhaul operations include expended filters and resins from air and water treatment systems, rags, paper, polyethylene, tools, and miscellaneous equipment. Materials from all NRF facilities that can be compressed are baled in a compactor located at ECF, which reduces material volumes by a factor of about 10. The bales are properly packaged for shipment and transferred to the NRTS burial ground by the burial site operator. Materials such as core structural components which cannot be compacted are packaged for shipment in accordance with AEC regulations.

Table 3 shows the annual volume and activity of NRF solid waste, both compacted and non-compacted, that has been buried since 1961 and demonstrates the improvements in waste management effected at NRF in recent years. In addition to installations of the baler-compactor, concerted management attention has been directed to development of administrative controls to reduce the volume of waste generated. Recent significant reduction in the volume of waste buried are shown in Figure 4.

As discussed earlier, the Expended Core Facility receives expended Naval reactor fuel components which are removed by the Navy from its nuclear powered ships. The AEC assumes custody for expended Naval reactor fuel at the refueling shipyard. The fuel is shipped under AEC custody to the National Reactor Testing Station, where first it goes to the Expended Core Facility at NRF and then to the Idaho Chemical Processing Plant for recovery of the remaining fissile material. At ECF non-fuel bearing portions of the fuel modules are removed prior to shipping the spent fuel to the Idaho Chemical Processing Plant. These portions of the modules are non-corroding stainless steel materials, whose radioactivity is due principally to cobalt-60 produced by activation during core operation in Naval nuclear powered ships. Approximately

Table 3

Summary of Annual NRF Solid Waste Burial*

Year	Volume (m^3)	Activity (Ci x 10^3)
1961	758	11
1962	836	12
1963	1173	21
1964	1031	24
1965	1553	501
1966	1450	787
1967	1385	801
1968	1561	193
1969	1812	644
1970	1932	101
1971	1574	55
1972	894	11

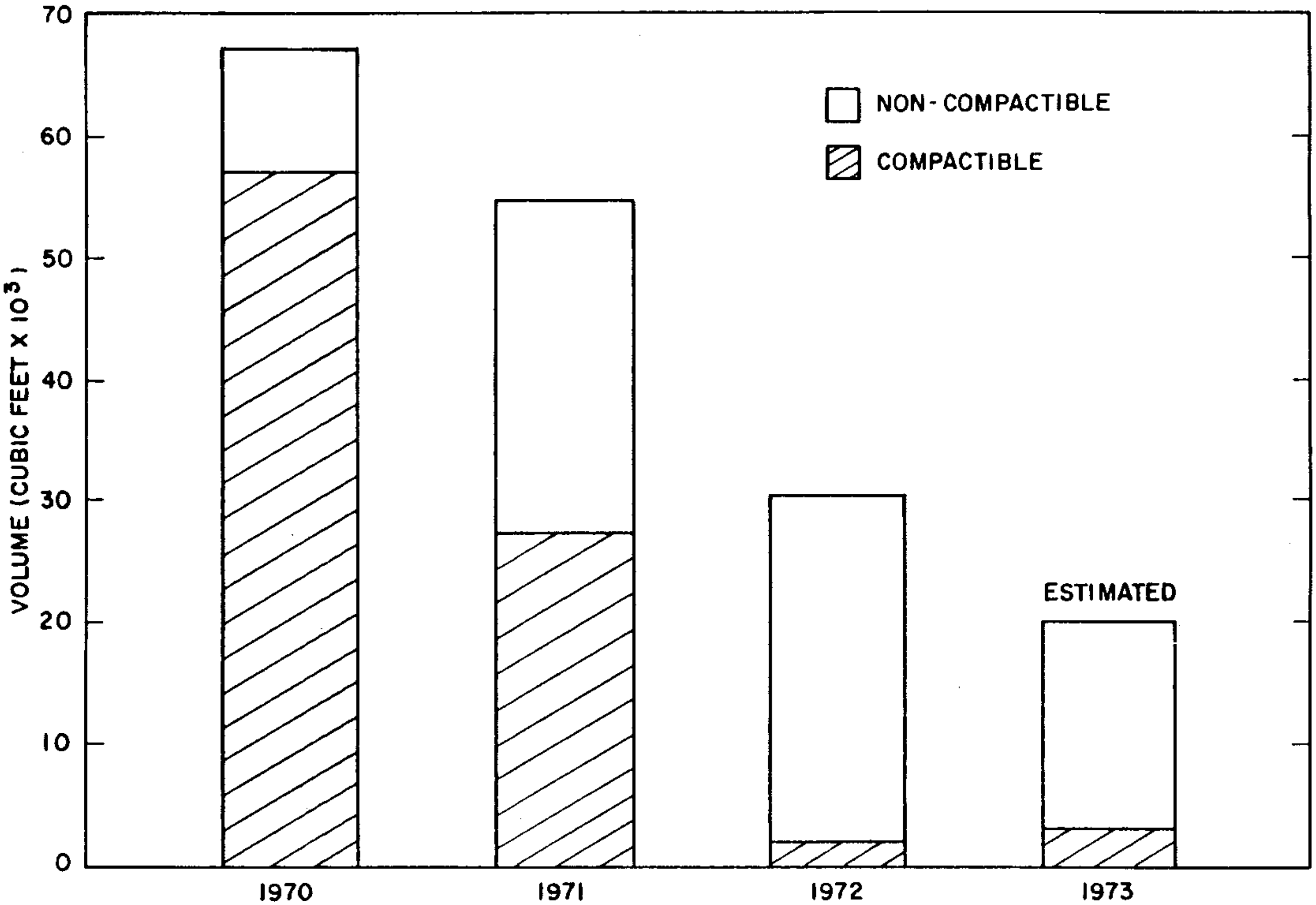
*Data obtained from AEC-ID Waste Management Information System report, which includes a summary of information reported since 1952.

Figure 4

NRF SOLID RADIOACTIVE WASTE

1970-1973 PERFORMANCE

REFERENCE: NRTS RADIOACTIVE WASTE MANAGEMENT INFORMATION SYSTEM



half of the volume and 95 percent of the radioactivity in NRF buried solid waste is produced in these ECF operations.

All the solid radioactive waste is transferred to the NRTS burial ground by the burial site operator. All material is carefully packaged, and the non-compacted Naval nuclear core non-fuel bearing components are packaged in strong shielded containers before transporting them to the burial site. All shipments are made in accordance with NRTS requirements, with stringent controls to prevent an accident which could cause the package to leave the transport vehicle. These controls include use of site security and radiological control escort, a maximum speed of ten miles per hour and careful periodic container and vehicle preventive maintenance. Even if an accident such as a head-on collision with another vehicle resulted in separation of the container from the transport vehicle, the container integrity would be maintained, and no significant environmental radiological effects would result. Furthermore, since most of the activity is metallurgically retained within the stainless steel structural components, any release of radioactivity from this material within the burial ground is inherently lower when compared with other types of solid radioactive waste.

C. Airborne

1. Airborne Radioactivity Control

The potential source of airborne radioactivity associated with the prototype is the radioactivity contained in the reactor coolant system. This system contains activated corrosion and wear products, activated impurities in reactor coolant, and small quantities of fission products. The radioactivity might be released and become airborne if reactor coolant leaks occurred, or during sampling operations, and maintenance and overhaul operations which require opening the system or working on contaminated components removed from the system. The unlikely possibility of radioactivity becoming airborne is minimized further by the high integrity of naval reactor fuel elements and primary coolant systems. In addition, stringent radiological controls which have been developed during 20 years of prototype operation at NRF are exercised during the operations listed above to minimize the potential release of airborne radioactivity.

2. Particulate Release

In ECF facilities where expended Naval reactor core components are routinely handled and the potential for airborne particulate release exists, all air which is released is first passed through high efficiency particulate filters with 99.97% efficiency for particulate removal, and/or charcoal filters. In prototype reactor compartments in the unlikely event that airborne particulate activity exceeds a concentration of 1×10^{-9} μCi/cm^3, continuous monitoring is maintained to enable rapid shutdown of ventilating equipment to prevent any significant release. The limit of 1×10^{-9} μCi/cm^3 is based on the Concentration Guide (Reference 1) for airborne release of insoluble cobalt-60 to anunrestricted area. Cobalt-60 is the predominant radioactive isotope associated with NRF operations.

To calculate particulate releases conservatively, it has been assumed that all air released had a concentration equal to the minimum detectable activity of the detection system. On this basis, NRF particulate releases in 1972 totalled only 0.065 Ci, with an average calculated concentration of 3.2×10^{-11} μCi/cm^3.

NRF has been installing improved fixed filter samplers on all exhausts which could potentially release airborne particulate radioactivity. When this improved monitoring capability is complete, it will be possible to detect releases at all locations down to concentrations of 1×10^{-15} μCi/cm^3, which is below natural background at NRF.

3. Gaseous Releases

Gaseous radioactivity at NRF is produced by activation of gaseous impurities in reactor coolant, by production of tritium from neutron capture in naturally occurring deuterium in the coolant, and by fission of the trace impurities of natural uranium in reactor structural materials. These gases are released when reactor coolant systems are drained or sampled. The principal isotopes produced, in addition to tritium which is discussed above, are argon-41 (1.8 hour half-life), Xenon-133 (5.3 days half-life), krypton-85 (10.7 year half-life). The total annual release of argon-41 is estimated to be about 5 curies. Within 24 hours this activity has decayed to one-thousandth of its release concentration, and it is of little environmental significance. Xenon-133 and krypton-85 release are much smaller, and it is estimated that the annual release from NRF of long-lived krypton-85 is no greater than 0.001 curie.

IV. Site Service Water Management

A. Cooling Water

Heat generated during prototype operations at NRF is removed by circulating secondary system coolant water from the reactor plants to spray ponds or to cooling towers where the heated water is cooled by evaporation. This process water is treated with proprietary chemicals to control pH, prevent corrosion, and control the growth of algae and bacteria. Water used in the Site boiler house steam systems is similarly treated. Chemical compositions of water in circulating coolant and the Site boiler house are shown in Table 4.

Table 4

Chemical Composition of Water in NRF Circulating Coolant and Boiler House Water

	Circulating Coolant	Boiler House
pH	5.8-6.5 (controlled with H_2SO_4)	10.3 - 11.5 (controlled with trisodium phosphate)
Phosphate ($PO_4^{\equiv}$)	12-17 ppm	150-300 ppm
Sulfite ($SO_3^{=}$)	-	30-125 ppm
Total Dissolved Solids	1300	1400

Cooling tower blowdown constitutes the bulk of the water released to the land treatment facility shown in Figure 2. This water is raw well water treated with sulfuric acid to a pH of 5.8 - 6.5, phosphate of ~10 ppm, and proprietary biocides. Another release consists of ion exchange column regenerants of concentrated sulfuric acid and 50% sodium hydroxide solutions. Raw well water is also treated by water softener for human use, and these softeners are regenerated using sodium chloride which is released to the facility.

The concentration of chemicals and solid materials in the cooling and boiler house systems is controlled by routine blowdowns which are made by discharging system water to a land treatment facility which is adjacent to the NRF perimeter.

Table 5 lists the characteristics of the water released to the land treatment facility. The utilization of this land treatment facility for such discharges is in compliance with proposed requirements for control of liquid waste material recommended in 1973 by the Idaho Board of Environmental and Community Services (Reference 3).

B. Sewage Treatment

Sewage from NRF is pumped directly into dual sewage lagoons located immediately northeast of the site, as shown in Figure 2. The raw sewage is decomposed by atmospheric oxygen or consumed by algae. The lagoons have a combined capacity of 14.6 million gallons, or 2.0 million cubic feet. Monthly input to the NRF lagoons varies from 1 to 1.5 million gallons, which evaporates naturally. The lagoons are lined with 6 inches of clay soil which was installed in 2-inch layers and compacted to 95% maximum density. Sediment depth in the ~100,000 square feet of lagoon area increases at a rate of 0.018 inch per year, assuming even distribution of the annual average of 750 cubic feet of nondegradable materials pumped to the ponds. No discharges or overflows from the ponds are anticipated.

Table 5

Site Service Liquid Release Characteristics

A. Land Treatment Facility

1. Quantity - 70.6 million gallons
2. Water Quality

pH	6.0-8.1
Conductivity (µmhos/cm)	850-5200
Total Dissolved Solids (ppm)	500-3100
$PO_4^{\equiv}$ (ppm)	8-10

3. Released Chemicals (pounds)

Polyphosphate	12500
$SO_3^{=}$	2000
H_2SO_4	150000
NaCl	520000
NaOH	19000
Proprietary biocides	4500

C. Airborne

A source of site service airborne waste is the burning of fuel for heating purposes. This produces SO_2, particulates, etc. Typical amounts are shown in Table 6. Other sources of airborne waste include an incinerator, cooling towers, and various chemistry hood exhausts. All of these releases have a negligible effect on the quality of the environment at NRF and meet the Idaho rules and regulations for control of air pollution (reference 4), as described in the 1972 NRTS Environmental Monitoring Report (reference 5).

Table 6

1972 NRF Site Service Releases

Boiler Stack Discharge	
Fuel burned (gallons x 10^6)	1.7
SO_2 (lb)	260,000
Particulates (lb)	5,700
Central Facilities Area Disposal	
Oils and Solvents (gallons)	3,600
Solids (ft^3)	

The amounts of SO_2 discharge listed in Table 6 result from use of #5 fuel oil for seven months and #2 fuel oil for five months in 1972. The current use of #5 fuel oil is not expected to increase these releases significantly.

D. Solid Waste

This waste consists of garbage from the cafeteria, construction debris, barrels of chemicals (either liquid or solid), oil, solvents, and paper waste. This waste is shipped to appropriate disposal locations by the operator of the NRTS Site.

V. Adverse Effects of Credible Accidents

A. Radioactive Liquids

Accidents involving liquid waste management systems that could credibly occur, with a subsequent release of radioactivity to the environment, involve a leak of reactor coolant or rupture of a tank containing unprocessed waste. The maximum amount of radioactivity in all NRF facilities containing liquids is estimated to be less than two curies, and therefore occurrence of one of these credible accidents would not result in a radioactive release of environmental significance.

Even though such releases would be small, engineered environmental safety features are included to prevent them. These features include location of tanks of unprocessed water in concrete encased vaults, high integrity systems fabricated of predominantly stainless steel, and procedural and administrative control to monitor activity and tank levels.

B. Radioactive Airborne

Credible accidents which could release airborne particulate radioactivity involve failure of high efficiency air particulate filtration systems. Such releases are minimized by use of continuous air monitors which provide alarms to shut down the offending systems. As noted above, releases of gaseous radioactivity are small and not considered to be of environmental significance.

VI. Conclusions

In summary, it is concluded that the Naval Reactor Facility waste management operations described above have had no significant adverse effects on the area surrounding the Facility. In particular, radioactive releases are strictly controlled to levels which are as low as practicable. In 1973, the radioactivity released in liquid effluents totalled <0.001 curie, and airborne radioactive particulate releases were <0.001 curie. Finally, all site service wastes are handled in accordance with the requirements of the State of Idaho.

References

1. Title 10, Code of Federal Regulations, Part 20, "Standards for Protection Against Radiation" and AECM Chapter 0524, "Standards for Radiation Protection."

2. Jacobs, D. G., "Sources of Tritium and Its Behavior Upon Release to the Environment," USAEC Report TID-24635, 1968.

3. Idaho Board of Environmental and Community Services, "Proposed Rules and Regulations for the Establishment of Standards of Water Quality and for Waste Water Treatment Requirements for Waters in the State of Idaho, March 1973 (Revised).

4. Idaho Board of Environmental Protection and Health, "Rules and Regulations for the Control of Air Pollution," October 25, 1972.

5. USAEC Idaho Operations Office, Environmental Sciences Branch, "1972 Environmental Monitoring Program Report," April, 1973.

Attachment 2

Subject: Environmental Assessment, Dismantling and Removal of the Army Re-entry Vehicle Facility Site (ARVFS).

Date: September 2, 1977

ENVIRONMENTAL ASSESSMENT

DISMANTLING AND REMOVAL OF THE ARMY RE-ENTRY VEHICLE FACILITY SITE (ARVFS)

Revised by: T. G. Hedahl
Date revised: September 2, 1977

TITLE: Dismantling and Removal of the Army Re-Entry Vehicle Facility Site (ARVFS)

1. DESCRIPTION OF THE PROPOSED ACTION: This project involves the dismantling and removal of the ARVFS process systems, and the demolition of associated facility systems. The remaining metal structure of the pit, the cable actuation system, and miscellaneous components will be removed and decontaminated as economically practical.

   The bunker, cable way and pit will be disassembled. The contaminated concrete of the pit and cable way will be demolished and disposed at the Radioactive Waste Management Complex (RWMC). The uncontaminated concrete will be demolished and used as backfill in deep pit excavations.

   The operational systems are contaminated with ^{60}Co and other unidentified fission products. The background radiation level is 1.2 mR/h.

   The ARVFS Facility is presently used as a storage bunker for four containers of contaminated sodium-potassium (NaK). This material was contained within the EBR-I reactor vessel at the time of the Mark II core meltdown and is highly radioactive. Radionuclide analysis indicates the presence of uranium, ^{137}cesium, ^{90}strontium-yttrium, plutonium, and various other minor constituents. Potassium superoxide may also be present. Radiation levels to 7 R/h have been found at the container surfaces.

2. DESCRIPTION OF THE EXISTING ENVIRONMENT: The Army Re-Entry Vehcile Facility Site (ARVFS) is located in the central part of the Idaho National Engineering Laboratory (INEL), in the north-central portion of the semiarid eastern Snake River Plain.

   The climate of the region is characterized as a "cool desert" with the vegetation and fauna typical of such a region. During the summer, days are warm, while nights are cool. Winters are cold and dry. The surrounding mountains strongly influence the INEL climate, and cause a southwest wind flow to predominate over most of the Snake River Plain. Nighttime winds are generally out of the northeast.

   The most important element of the surface water hydrology near ARVFS is the Big Lost River which is located a few kilometers to the west. The principal ground water feature is the Snake River Plain Aquifer, which underlies the entire eastern Snake River Plain. The depth to this aquifer, at the ARVFS, is approximately 104 m (340 ft).

   No known endangered species permanently inhabit the INEL site. Populations of small mammals, reptiles, and birds are in sizable abundance. Pronghorn antelope and sage grouse are frequently seen throughout the site. Several migratory species of birds, such as larks, doves, hawks, ducks, geese, and eagles commonly pass over or reside at the INEL.

3. POTENTIAL ENVIRONMENTAL IMPACTS:

   a. CONSTRUCTION: The ARVFS area has been previously disturbed by the construction of numerous buildings and facilities. Thus, operations associated with this project are not expected to have a significant additional impact on the existing environment.

All activities will be conducted in accordance with Health and Safety regulations issued by the Secretary of Labor in 29 CFR, Part 1910 and 1926, and ERDAM-0550-1, report NO. IDO-12028, Standard Health and Safety Requirements. In addition, work will be performed under close Health Physics surveillance. This will ensure that the work proceeds safely and that no undue personnel exposure or contamination spread occurs.

Explosives may be used to section the concrete structure. Demolition operations will be limited to times of favorable weather conditions to minimize contamination spread. Explosives will be shipped, stored, and handled in accordance with MD-6, Section 6.15.

b. OPERATION: Contaminated components will be wrapped and sealed in plastic immediately following removal and placed in a designated Health Physics monitored storage area. All solid radioactive waste will be disposed in accordance with MD-8, Section 6.42.

Noncontaminated waste materials will be directed to the CFA Sanitary Landfill in accordance with MD-6, Section 11.12 and MD-8, Section 6.39.

Dust will arise from the excavation and backfill activities. However, the ARVFS facitity is isolated from operational facilities and the soil surrounding the immediate site contains minimal contamination. Dust problems should not have an additional impact on the normal desert environment beyond the ARVFS area.

c. SITE RESTORATION: At the completion of demolition activities and the disposal of waste, the D&D work areas will be radiologically surveyed and the surface will be skimmed if necessary. All excavations will be backfilled and graded to surrounding contours. Crested wheat grass will be planted in all disturbed earth areas.

d. CUMULATIVE AND LONG-TERM ENVIRONMENTAL EFFECTS: The total project should not add significantly to the existing waste disposal facilities. No cumulative or long-term environmental impacts are anticipated. No significant irretrievable or irreversible commitments of natural resources are expected. Any equipment that is still required or can be utilized elsewhere, after the project is completed, could be salvaged for use. However, decontamination procedures may be required before the equipment can be excessed.

4. COORDINATION WITH FEDERAL, STATE, REGIONAL, AND LOCAL PLANS: There are no known conflicts with Federal, state, regional, or local plans and programs.

5. ANTICIPATED BENEFITS AND ALTERNATIVES:

a. BENEFITS: The completion of this $24,900 project will dismantle and remove the Army Re-Entry Vehicle Facility Site and its support systems. Since the system is surplus to the identifiable needs of any ERDA program, such a project will remove a potential radiation and contamination hazard from the environment.

b. ALTERNATIVES: The planned D&D activities at ARVFS necessitate a revised plar of storage of the NaK material. Five potential alternatives to the present status have been developed and are offered for further consideration. Each alternative would be performed in accordance with a Safety Division approved procedure and with continuous monitoring by Safety Division personnel.

Alternative 1:

Remove the ARVFS from the list of surplus facilities. This alternative will not solve the problem but would rather defer resolution and is contradictory to the environmental objectives of ERDA regarding contaminated surplus facilities.

Alternative 2:

D&D only the pit area and cable way, leaving the control room bunker as a storage area as presently designated.

This alternative will not solve the problem, but rather defer resolution as in alternative NO. 1. Other considerations are a greater overall cost for D&D operations of ARVFS if performed in two phases.

Alternative 3:

Place the existing steel box container with the NaK in a larger concrete box structure. The annular space would then be filled with clean dry sand and a cover plate poured in place. The entire external surface would then be sprayed with an asphaltic sealant.

The ARVFS D&D activities could then be completed and the sealed shielding container left at the site. An isolation fence would be erected for access control and personnel safety.

This alternative would permit completion of ARVFS D&D activities, but, in addition, a contaminated material temporary storage area would be created.

Alternative 4:

The NaK with the protective container would be packaged and secured as described in Alternative 3. The sealed shielded container would then be transported to the RWMC for temporary storage. Suggested storage sites at the RWMC are the lave outcrop adjacent to the N.W. corner of pit NO. 3 or the more isolated area adjacent to the S.W. corner of trench NO. 58.

This alternative permits D&D of the ARVFS. It does not create a new radioactive material storage area and it is in an already restricted access area. It does, however, place liquid metal in the RWMC.

Alternative 5:

Design and fabricate a NaK-sodium processing facility. Process the NaK into a solidified caustic and transfer this product to the RWMC for disposal.

This alternative would require the development and construction of a new operating facility. The potential magnitude could result in GPP or line item funding.

The Proposed project will provide valuable experience for future D&D programs at the INEL. Therefore, this project is the most practical and feasible choice.

Attachment 3

Subject: Environmental Assessment, CF-662 Cafeteria Window Replacement.

Date: September 2, 1977

Content: Solid, nonradioactive waste in the form of construction debris was disposed to CFA Landfill II.

ENVIRONMENTAL ASSESSMENT

CF-662 CAFETERIA WINDOW REPLACEMENT

Prepared by: T. G. Hedahl
Date prepared: September 2, 1977

TITLE: CF-662 Cafeteria Window Replacement

1. DESCRIPTION OF THE PROPOSED ACTION: This project involves the replacement of the existing windows at the CF-662 Cafeteria at the Central Facilities Area (CFA) of the Idaho National Engineering Laboratory (INEL). The "thermopane" type windows will be installed on the south side of the dining room and on the east side of the conference room.

   These windows will be double pane with a 1.3 cm (0.5 in.) air space, and will have a coefficient of transmission, U, of 0.55 BTU/h-0.09 m^2-0.56 °C (0.55 BTU/h-ft^2-°F). Any framing modifications or repairs will be performed before the installation of the insulating glass to assure minimum future air infiltration.

2. DESCRIPTION OF THE EXISTING ENVIRONMENT: The Central Facilities Area (CFA) is located in the wouthwestern part of the Idaho National Engineering Laboratory (INEL), in the north-central portion of the semiarid eastern Snake River Plain.

   The climate of the region is characterized as a "cool desert" with the vegetation and fauna typical of such a region. During the summer, days are warm, while nights are cool. Winters are cold and dry. The surrounding mountains strongly influence the INEL climate, and cause a southwest wind flow to predominate over most of the Snake River Plain. Nighttime winds are generally out of the northeast.

   The most important element of the surface water hydrology near CFA is the Big Lost River which is located 6.4 km (4 mi) to the northwest. The principal ground water feature is the Snake River Plain Aquifer, which underlies the entire eastern Snake River Plain. The depth to this aquifer, at CFA, is approcimately 155 m (510 ft).

   No known endangered species permanently inhabit the INEL site. Populations of small mammals, reptiles, and birds are in sizable abundance. Pronghorn antelope and sage grouse are frequently seen throughout the site. Several migratory species of birds, such as larks, doves, hawks, ducks, geese, and eagles commonly pass over or reside at the INEL.

3. POTENTIAL ENVIRONMENTAL IMPACTS:

   a. CONSTRUCTION: Since this area has been previously disturbed by the construction of numerous buildings and facilities, the project should not have a significant additional impact on the existing environment.

      Some solid, nonradioactive waste, primarily in the form of construction debris, will be generated. Such waste will be disposed in accordance with MD-8, Section 6.39 and MD-6, Section 11.12.

      Noise levels will increase during the construction period which may be distracting to some of the nearby offices. However, noise levels will not be of a hazardous nature.

   b. OPERATION: This proposal will not alter the essential features of water and pollution control at the INEL. The project will not add significantly to the various existing disposal systems in CFA.

c. SITE RESTORATION: Minimal site restoration will be required with this window replacement project. Site restoration will consist primarily of cleanup procedures.

d. CUMULATIVE AND LONG-TERM ENVIRONMENTAL EFFECTS: It is anticipated that no cumulative or long-term environmental impacts will result from this project. There should be no significant irretrievable or irreversible commitments of natural resources involved in the project.

4. COORDINATION WITH FEDERAL, STATE, REGIONAL OR LOCAL PLANS: There are no known conflicts with Federal, state, regional, or local plans and programs.

   The proposed project is also consistent with the nationwide practice of energy conservation through improved energy efficiency by providing insulating windows for buildings.

5. ANTICIPATED BENEFITS AND ALTERNATIVES:

   a. BENEFITS: The completion of this $12,000 project will replace the existing windows at the CFA Cafeteria with insulating window glass. This window replacement project represents an energy savings of nearly 16.7 m^3 (4400 gal) of fuel oil and 1170 kwh of electricity a year at a cost of $2080/year.

   b. ALTERNATIVES: A no-action alternative would hinder projected energy conservation improvements established for the INEL. The existing windows at the cafeteria are loose fitting and allow an excess amount of air infiltration during both the heating and cooling seasons. A significant amount of energy (fuel oil and electricity) is wasted due to the existing single pane windows. Therefore, the proposed project appears to be the most practical and feasible choice.

Attachment 4

Subject:	Environmental Assessment, CF-662 Receiving and Inspection Facility
Date:	September 2, 1977
Content:	Solid, nonradioactive waste in the form of construction debris was disposed to CFA Landfill II (see Section 3.a).

ENVIRONMENTAL ASSESSMENT

CF RECEIVING AND INSPECTION FACILITY

Prepared by: T. G. Hedahl
Date prepared: September 2, 1977

TITLE: CF Receiving and Inspection Facility

1. DESCRIPTION OF THE PROPOSED ACTION: This project consists of the design, demolition, and construction necessary to provide an addition of approximately 223 m^2 (2400 ft^2) to the southeast corner of Warehouse Building CF-601 at the Central Facilities Area (CFA) of the Idaho National Engineering Laboratory (INEL). The addition will accommodate a clean area with temperature control and good lighting for quality control inspections and measuring.

   The addition will be constructed of 30 cm (12 in.) reinforced masonry with a steel joist and metal deck roof structure. The existing steam, condensate, fire sprinkler and electrical systems will be extended to service the addition. A heating and ventilation system will also be installed which will provide $\pm$ 5 °F temperature control.

   Demolition will involve removal of approximately 24 m (80 ft) of railroad track at the southeast corner of the Warehouse and removal of three windows in the existing building.

   Approximately 46 m^3 (60 yd^3) of concrete foundation and 42.7 m (140 ft) of masonry wall will be constructed for the addition. Two personnel door openings and a new truck door opening will be built in the existing wall.

2. DESCRIPTION OF THE EXISTING ENVIRONMENT: The Central Facilities Area (CFA) is located in the southwestern part of the Idaho National Engineering Laboratory (INEL), in the north-central portion of the semiarid eastern Snake River Plain.

   The climate of the region is characterized as a "cool desert" with the vegetation and fauna typical of such a region. During the summer, days are warm, while nights are cool. Winters are cold and dry. The surrounding mountains strongly influence the INEL climate, and cause a southwest wind flow to predominate over most of the Snake River Plain. Nighttime winds are generally out of the northeast.

   The most important element of the surface water hydrology near CFA is the Big Lost River which is located 4.6 km (4 mi) to the northwest. The principal ground water feature is the Snake River Plain Aquifer, which underlies the entire eastern Snake River Plain. The depth to this aquifer, at CFA, is approximately 155 m (510 ft).

   No known endangered species permanently inhabit the INEL site. Populations of small mammals, reptiles, and birds are in sizable abundance. Pronghorn antelope and sage grouse are frequently seen throughout the site. Several migratory species of birds, such as larks, doves, hawks, ducks, geese, and eagles commonly pass over or reside at the INEL.

3. POTENTIAL ENVIRONMENTAL IMPACTS:

   a. CONSTRUCTION: The construction of this proposed project will occur in an area that has been previously disturbed, and thus, will not produce a significant additional impact on the overall INEL environment.

      Construction activities will involve soil excavation and compaction for the foundation base of the new addition. Demolition of portions of the existing structure will be required. Solid, nonradioactive waste, primarily in the form of construction debris, will be generated. Such waste will be properly disposed in accordance with MD-8, Section 6.39 and MD-6, Section 11.12.

A short-term impact will occur during construction involving the cut-off of electrical and water services for a short period of time to allow for new utility installation into the existing lines. Dust will also arise from the excavation and construction activities. However, these impacts are only temporary, and should not be of any environmental significance in the CF area. Noise levels will increase during the construction period which may be distracting to some of the nearby offices. However, noise levels will not be of a hazardous nature.

Normal working conditions at CF-601 Warehouse Building will probably be disrupted during the construction period. Temporary blocking of traffic on Nevada street and Lansing Avenue may also occur occasionally from construction vehicles and equipment.

b. OPERATION: This proposal will not alter the essential features of water and air pollution at the INEL under normal operations. The project will not add significantly to the various existing electrical and water systems in CFA.

c. SITE RESTORATION: Upon completion of the Warehouse Building addition, the immediate area surrounding the structure will be restored as near as possible to its prior state, Grading and landscaping will be necessary in order to achieve proper restoration.

d. CUMULATIVE AND LONG-TERM ENVIRONMENTAL EFFECTS: Such a project will add to the continued expansion of CFA. However, it is anticipated that no cumulative or long-term environmental impacts will result from this proposed project. There should be no significant irretrievable or irreversible commitments of natural resources involved in the expanded facility.

4. COORDINATION WITH FEDERAL, STATE, REGIONAL, AND LOCAL PLANS: There are no known conflicts with Federal, state, regional, or local plans and programs.

5. ANTICIPATED BENEFITS AND ALTERNATIVES:

a. BENEFITS: The completion of this $226,000 project will provide an addition to CF-601 to alleviate the many problems encountered in the handling and checking of incoming material at the INEL. Such a project will improve the cleanliness and lighting required to perform inspection and testing procedures using various sophisticated electrical, mechanical and optical inspection equipment. Humidity and temperature control will help negate the corrosion and ultimate destruction of valuable mechanical measuring devices. An increase in storage and working space will also improve repacking and handling procedures at the Warehouse Building.

b. ALTERNATIVES: Alternatives to the project are as follows:

(1) Remodeling of the existing warehouse

(2) No-action alternative

The alternate solution for providing needed space for Quality Assurance and still having direct access to the Warehouse was to remodel the existing Warehouse. Not only was this alternative more expensive by approximately $20,000, but space would have to be taken from the main Warehouse floor area.

A no-action alternative would hinder the efficient inspection and handling procedures for INEL equipment and parts. Additional labor costs would also be incurred through the need for constant cleaning between inspection set-ups. Therefore, the proposed project appears to be the most practical and feasible choice.

Attachment 5

Subject: Environmental Assessment, LOFT Closed Loop Treated Water Cooling System.

Date: September 2, 1977

Content: Solid, nonradioactive waste in the form of construction debris was disposed to CFA Landfill II (see Section 3.a).

ENVIRONMENTAL ASSESSMENT

LOFT CLOSED LOOP TREATED WATER COOLING SYSTEM

Prepared by: T. G. Hedahl
Date prepared: September 2, 1977

TITLE: LOFT Closed Loop Treated Water Cooling System

1. DESCRIPTION OF THE PROPOSED ACTION: This project involves the construction of an independent cooling system for the Loss of Fluid Test (LOFT) emergency diesel generator (DG-B). The DG-B is located in the basement of Building TAN-630 in the Test Area North (TAN) complex at the Idaho National Engineering Laboratory (INEL). TAN-630 has a basement and one ground level floor bermed over completely with earth.

   The existing system uses heat exchangers cooled by once-through industrial water. The installation of the closed loop system would eliminate the need for large quantities of industrial water to cool the engine jacket water and lubricating oil.

   The DG-B unit is a Plant Protection System (PPS) component that must remain operable for a Safe Shutdown Earthquake (SSE). The cooling system is currently supplied by water from the deep wells through the water storage tank and 549 m (1800 ft) of buried pipe.

   The connecting piping will be designed to place the air cooled heat exchanger outside the building to eliminate the need for changing the heating and ventilation systems in TAN-630. Piping installation must interface appropriately with DG-B connections and piping supports must comply with LOFT seismic criteria (LTR 10-19).

   Major components are as follows:

   (1) One Young air cooled heat exchanger, Model HC 1010, with a 40 horsepower fan and electric motor.

   (2) Expansion tank

   (3) Flexible sections for installation of piping to the radiator

   (4) A new water pump with a larger discharge head.

2. DESCRIPTION OF THE EXISTING ENVIRONMENT: The Test Area North (TAN) is located in the north-central part of the Idaho National Engineering Laboratory (INEL), in the north-central portion of the semiarid eastern Snake River Plain.

   The climate of the region is characterized as a "cool desert" with the vegetation and fauna typical of such a region. During the summer, days are warm, while nights are cool. Winters are cold and dry. The surrounding mountains strongly influence the INEL climate, and cause a southwest wind flow to predominate over most of the Snake River Plain. Nighttime winds are generally out of the northeast.

   The most important element of the surface water hydrology near TAN is the Big Lost River Playa which is located 6.4 km (4 mi) to the southwest. The principal ground water feature is the Snake River Plain Aquifer, which underlies the entire eastern Snake River Plain. The depth to this aquifer, at TAN, is approximately 63 m (206 ft).

   No known endangered species permanently inhabit the INEL site. Populations of small mammals, reptiles, and birds are in sizable abundance. Pronghorn antelope and sage grouse are frequently seen throughout the site. Several migratory species of birds, such as larks, doves, hawks, ducks, geese, and eagles commonly pass over or reside at the INEL.

3. POTENTIAL ENVIRONMENTAL IMPACTS:

   a. CONSTRUCTION: The TAN area has already been previously disturbed by the construction of numerous buildings and facilities. Thus, operations associated with this project are not expected to have a significant additional impact on the existing environment.

      Solid nonradioactive waste, primarily in the form of construction debris, will be generated, Such waste will be disposed in accordance with MD-8, Section 6.39 and MD-6, Section 11.12.

      The actual installation of the cooling system must be coordinated with the LOFT Program Office so that DG-B is not out of service when a demand for emergency power may be required.

      There is no radioactive or chemical contamination in the area, and construction acitvities should not interfere with LOFT program operations.

   b. OPERATION: This proposal should improve the essential features of water and air pollution control at the INEL by eliminating an injection well for waste water.

      The operation of this project will require periodic flushing and addition of the 52.5% ethylene glycol and 47.5% water (by volume) solution in the heat exchanger. Such liquid waste will be disposed in accordance with MD-6, Section 11.22 and MD-8, Section 6.30.

   c. SITE RESTORATION: Upon completion of the cooling system installation project, the immediate area surrounding the system will be restored as near as possible to its prior state.

   d. CUMULATIVE AND LONG-TERM ENVIRONMENTAL EFFECTS: It is anticipated that this proposed project will not produce any cumulative or long-term environmental effects. There should be no significant irretrievable or irreversible commitments of natural resources involved in the project. Any equipment that is still needed or can be utilized elsewhere, after the system is no longer useful, could be salvaged for use.

4. COORDINATION WITH FEDERAL, STATE, REGIONAL, OR LOCAL PLANS: There are no known conflicts with Federal, state, regional, or local plans and programs.

5. ANTICIPATED BENEFITS AND ALTERNATIVES:

   a. BENEFITS: The completion of this \$160,000 project will provide an independent cooling system for the LOFT emergency diesel generator (DG-B). Such a system will eliminate the need for large quantities of water, and will permit the injection well at LOFT to be closed. The closed loop system will also provide emergency independence in the event of a seismic occurrence and will be more resistant to corrosion than the existing system.

b. ALTERNATIVES:

(1) Alternative equipment

(2) No-action alternative

The cooling system for the DG-B unit must be designed to comply with LOFT seismic criteria (LTR 19-10). In addition, the equipment must be properly sized and compatible with existing controls for efficient engine operation. The no-action alternative would leave the diesel generator vulnerable to seismic damage and would leave the existing system unsuitable as a PPS component. Therefore, the proposed project is the most practical and feasible choice.

Attachment 6

Subject:	Environmental Assessment, Dismantling and Removal of the Material Testing Reactor (MTR).
Date:	September 1, 1977
Content:	Solid, nonradioactive waste in the form of construction dèbris was disposed of CFA Landfill II (see Section 3.b).

ENVIRONMENTAL ASSESSMENT

DISMANTLING AND REMOVAL OF THE MATERIAL TESTING REACTOR (MTR)

Revised by: T. G. Hedahl
Date revised: September 1, 1977

TITLE: Dismantling and Removal of the Material Testing Reactor (MTR)

1. DESCRIPTION OF THE PROPOSED ACTION: The project involves the dismantling and removal of the entire main reactor structure at the MTR-603 reactor building. All precautions must be taken to ensure that the MTR dismantling operations do not adversely affect the existing operating facilities at the Test Reactor Area (TRA).

   This main structure is a 3.2 m^2 (34 ft^2) facility centrally located in MTR-603. The outer portion of the biological structure is high density concrete enclosed by a steel liner. In-bedded in this concrete are the structural supports, air ducting, water systems, reactor vessel, and numerous experiment penetrations. Directly around the reactor core area is a graphite ball zone which is surrounded by a solid graphite section approximately 1.3 m^2 (14 ft^2) by 2.7 m (9 ft) high. Enclosing the graphite on all sides are two 10 cm (4 in.) thick carbon steel plates which serve as thermal shields.

   All of these layered sections will have to be dismantled and removed to appropriate storage areas. However, the MTR has many dismantling problems not present in most conventional power reactors. Carbon dust, ^{14}C, and combustibility problems exist. Other problems are the numerous penetrations into the structure, the interlacing of utility systems through the concrete, the remote location of the canal, and the contamination problems from previous fission breaks.

   The dismantling of the MTR structure has been divided into two major tasks. Task I consists of preliminary preparation work including the removal of some easily retrievable components. Task II deals primarily with the general demolition operations.

   TASK I:

   1. Remove In-Tank components
   2. Remove Graphite Pebble Shielding
   3. Remove Reactor Vessel Tanks B and C
   4. General Preparation and Isolation

   TASK II

   1. Prepare Sub-Pile Room
   2. Remove Vessel Tank D and Top Section of E Tank
   3. Remove Reactor Vessel Tanks A and the Remainder of E
   4. Removal of Experiment Penetration Inserts
   5. Stage Demolition of the Biological Shielding

2. DESCRIPTION OF THE EXISTING ENVIRONMENT: The Materials Testing Reactor (MTR) is located in the southwestern part of the Idaho National Engineering Laboratory (INEL), in the north-central portion of the semiarid eastern Snake River Plain.

The climate of the region is characterized as a "cool desert" with the vegetation and fauna typical of such a region. During the summer, days are warm while nights are cool. Winters are cold and dry. The surrounding mountains strongly influence the INEL climate, and cause a southwest wind flow to predominate over most of the Snake River Plain. Nighttime winds are generally out of the northeast.

The most important element of the surface water hydrology near MTR is the Big Lost River which is located 2 km (1.3 mi) to the southeast. The principal ground water feature is the Snake River Plain Aquifer, which underlies the entire eastern Snake River Plain. The depth to this aquifer, at MTR, is approximately 137 m (450 ft).

No known endangered species permanently inhabit the INEL site. Populations of small mammals, reptiles, and birds are in sizable abundance. Pronghorn antelope and sage grouse are frequently seen throughout the site. Several migratory species of birds, such as larks, doves, hawks, ducks, geese, and eagles commonly pass over or reside at the INEL.

3. POTENTIAL ENVIRONMENTAL IMPACTS:

a. CONSTRUCTION: The MTR area has already been previously disturbed by the construction of numerous buildings and facilities. Thus, operations associated with this project are not expected to have a significant additional impact on the existing environment.

   All activities will be conducted in accordance with Health and Safety regulations issued by the Secretary of Labor in 20 CFR, Part 1910 and 1926, and ERDAM-0550-1, report NO. IDO-12028, Standard Health and Safety Requirements. In addition, work will be performed under close Health Physics surveillance. This will ensure that the work proceeds safely and that no undue personnel exposure of contamination spread occurs.

   The presence of graphite both in solid form and in balls near the core lattice poses certain problems. In the dismantling process, the carbon dust must be contained both to ensure that nuisance dust levels do not exceed industrial hygiene limits and that carbon fourteen (^{14}C) emissions stay within the AECM 0524 guide concentrations. Although ^{14}C is not anticipated to be a problem according to calculations, an analysis of the graphite balls will be required to substantiate the actual maximum levels of ^{14}C that will be received.

   Combustibility of the graphite balls and dust in either dismantling with plasma cutters or explosives must be considered. This problem is complicated by the increase in stored energy in crystaline lattices due to neutron bombardment (Wigner Effect) which in effect lowers the combustion temperature of the graphite balls for self-sustained combustion from 820 $^{\circ}C$ to 750 $^{\circ}C$. Removal of the graphite balls and spraying the resultant cavity with a non-flamable fixative prior to the addition of an external heat source will eliminate this problem to a great extent.

b. OPERATION: After removing the core components and retrievable in-tank items, an exact radiation mapping can be obtained to determine what methods are to be ultimately utilized to remove the imbedded tanks. Samples taken during the removal of the graphite pebbles will indicate whether or not ^{14}C will cause any problems.

All contaminated and irradiated waste items stored in the canal will be disposed at the Radioactive Waste Management Complex (RWMC). Solid radioactive waste will be disposed in accordance with MD-8, Section 6.42. Filtering systems will be installed in the air exhaust system as required to minimize the spread of contamination.

Noncontaminated, waste materials will be directed to the CFA Sanitary Landfill in accordance with MD-6, Section 11.12 and MD-8, Section 6.39.

Components smaller than 58 cm^2 (9 $in.^2$) can be discharged from the reactor to the waste canal through a discharge chute. Larger items will be removed over the top of the reactor in transfer casks. Personnel shielding during removal operations will be provided by maintaining a maximum practical water level in the reactor vessel. A significant quantity of contaminated water from the waste canal and reactor vessel will be generated. All contaminated liquid effluent will be disposed in accordance with MD-6, Section 11.21.

The graphite pebbles will be dumped into plastic lined steel barrels through the discharge chutes in the reactor basement. Dust emissions during discharge will be controlled by utilizing a double containment bag out system and by providing a negative pressure at the discharge nozzle with the existing reactor air system.

c. SITE RESTORATION: Upon completion of the dismantling and removal operations, the immediate area will be restored as nearly as possible to its prior state.

Entombment of the various reactor components may be more practical on an engineering and economic standpoint. If such operations are included with the project, site restoration of the entombed area will also be required.

d. CUMULATIVE AND LONG-TERM ENVIRONMENTAL EFFECTS: The total project should not add significantly to the existing waste disposal facilities. No cumulative or long-term environmental impacts are anticipated. No significant irretrievable or irreversible commitments of natural resources are expected. Any equipment that is still required or can be utilized elsewhere, after the project is completed, could be salvaged for use. However, decontamination procedures may be required before the equipment can be excessed.

4. COORDINATION WITH FEDERAL, STATE, REGIONAL, AND LOCAL PLANS: There are no known conflicts with Federal, state, regional, or local plans and programs.

5. ANTICIPATED BENEFITS AND ALTERNATIVES:

a. BENEFITS: The completion of this project will dismantle and remove the MTR main reactor structure. Since the system is surplus to the identifiable needs of any ERDA program, such a project will remove a potential radiation and contamination hazard from the environment.

b. ALTERNATIVES: The exact method to be utilized in removing the imbedded portions of the tanks has not been determined at this time. Possible considerations are as follows:

1. Explosive Cutting
2. Milling Exposed Portions of Tank

3. Plasma-Arc Sectioning

4. Removal of Tank Sections following Removal of Surrounding Biological Shield

Alternatives to the Proposed project are as follows:

1. Entombment of existing structure

2. Conversion to a new nuclear system

3. Inactivating (mothballing) the reactor

4. No-action alternative

Entombment of the entire reactor components would require continued environmental surveillance and maintenance. The conversion alternative has many technological restrictions and no programs are currently projected that could utilize the structure. Mothballing would cause continued surveillance and would defer action until a later date. Such an alternative would still require the eventual entombment or removal of the facility. A no-action alternative conflicts with current ERDA policies that require decontamination and removal of surplus contaminated facilities.

The proposed project will provide valuable experience for future dismantling programs at the INEL. Therefore, this project is the most practical and feasible choice.

Attachment 7

Subject:	Environmental Assessment, Demolition and Removal of the Auxiliary Reactor Area IV (ARA IV).
Date:	August 30, 1977
Content:	Solid, nonradioactive waste in the form of construction debris was disposed to CFA Landfill II (see Section 3.b).

ENVIRONMENTAL ASSESSMENT

DEMOLITION AND REMOVAL OF THE AUXILIARY REACTOR AREA IV (ARA IV)

Revised by: T. G. Hedahl
Date revised: August 30, 1977

TITLE: Demolition and Removal of the Auxiliary Reactor Area IV (ARA IV)

1. DESCRIPTION OF THE PROPOSED ACTION: This project involves the excavation, demolition and removal of the contaminated liquid waste storage tank, waste drain piping, sampling tube duct, and the leaching pit for the contaminated waste tank discharge at the ARA-IV facility. All components of the excessed liquid waste system will be dismantled and removed. The system consists of 38 m (125 ft) of contaminated drain line [5-cm (2 in.) stainless steel] and 152 m (500 ft) of sampling tube duct. The liquid waste storage tank has a capacity of 56.8 m^3 (15,000 gal) and is made from stainless steel.

   Health physics survey smears on external and accessible internal surfaces have shown no detectable contamination. The facility has an average background radiation level of less than 0.1 mR/h. A radiation source in the outside pavement near the facility measures 700 mR/h. The resin in the liquid waste system has contamination levels of 90 d/s/g-gamma, 59.5 d/s/g-beta, and 0.32 d/s/g-alpha.

2. DESCRIPTION OF THE EXISTING ENVIRONMENT: The Auxiliary Reactor Area IV facility is located in the south-central part of the Idaho National Engineering Laboratory (INEL), in the north-central portion of the semiarid eastern Snake River Plain.

   The climate of the region is characterized as a "cool desert" with the vegetation and fauna typical of such a region. During the summer, days are warm, while nights are cool. Winters are cold and dry. The surrounding mountains strongly influence the INEL climate, and cause a southwest wind flow to predominate over most of the Snake River Plain. Nighttime winds are generally out of the northeast.

   The most important element of the surface water hydrology near ARA IV is the Big Lost River which is located 8.9 km (5.5 mi) to the northwest. The principal ground water feature is the Snake River Plain Aquifer, which underlies the entire eastern Snake River Plain. The depth to this aquifer, at ARA IV, is approximately 152 m (500 ft).

   No known endangered species permanently inhabit the INEL site. Populations of small mammals, reptiles, and birds are in sizable abundance. Pronghorn antelope and sage grouse are frequently seen throughout the site. Several migratory species of birds, such as larks, doves, hawks, ducks, geese, and eagles commonly pass over or reside at the INEL.

3. POTENTIAL ENVIRONMENTAL IMPACTS:

   a. CONSTRUCTION: The ARA IV area has already been disturbed by construction of existing facilities. Thus, the project should not have a significant additional impact on the existing environment.

      All activities will be conducted in accordance with the Health and Safety regulations issued by the Secretary of Labor in 29 CFR, Part 1910 and 1926, and ERDAM-0550-1, report NO. IDO-12028, Standard Health and Safety Requirements. In addition, work will be performed under close Health Physics surveillance to ensure that work proceeds safely and that no undue personnel exposure or contamination spread occurs.

The liquid waste storage tank (ARA-731) will be transferred to the Experimental Breeder Reactor-II (EBR II). All associated drain lines of the tank will be considered to have the same contamination levels as the tank resin. Therefore, Health Physics surveillance and procedures will be required during the removal operations.

b. OPERATION: Contaminated components will be wrapped and sealed in plastic immediately following removal and placed in a designated radioactive waste storage area. Catch pans will be used to collect cuttings from all grinding and sawing operations on contaminated piping and components. All solid radioactive waste will be disposed in accordance with MD-8, Section 6.42.

Noncontaminated waste materials will be directed to the CFA sanitary landfill in accordance with MD-6, Section 11.12 and MD-8, Section 6.39.

Salvageable materials will be transferred to the excess materials storage area.

Dust will arise from the excavation and removal operations. However, the ARA-IV area is isolated from operational facilities and the soil surrounding the immediate site contains minimal contamination. Dust problems should not have an additional impact on the normal desert environment beyond the ARA-IV area.

c. SITE RESTORATION: Upon completion of the demolition and removal operations, the immediate area will be restored as nearly as possible to its prior state. Grading, grass seeding, and landscaping will be necessary to achieve proper restoration.

d. CUMULATIVE AND LONG-TERM ENVIRONMENTAL EFFECTS: The total project should not add significantly to the existing waste disposal facilities. No cumulative or long-term environmental impacts are anticipated. No significant irretrievable or irreversible commitments of natural resources are expected. Any equipment that is still required or can be utilized elsewhere, after the project is completed, could be salvaged for use. However, decontamination procedures may be required before the equipment can be excessed.

4. COORDINATION WITH FEDERAL, STATE, REGIONAL, AND LOCAL PLANS: There are no known conflicts with Federal, state, regional, or local plans and programs.

5. ANTICIPATED BENEFITS AND ALTERNATIVES:

a. BENEFITS: The completion of this $18,290 project will dismantle and remove the ARA-IV liquid waste system components. Since the system is surplus to the identifiable needs of any ERDA program, such a project will remove a potential radiation and contamination hazard from the environment.

b. ALTERNATIVES: Alternatives to the proposed project are as follows:

(1) Decontamination of the ARA-IV system

(2) No-action alternative

A complete decontamination program for the entire system would be prohibitively expensive. In addition, many of the system components are no longer useful, and therefore, no attempts will be made to surplus them. The no-action alternative conflicts with current ERDA policies that require decontamination and removal of surplus contaminated facilities.

The proposed program will provide valuable experience for future D&D programs at the INEL. Therefore, this project is the most feasible and practical choice.

Attachment 8

Subject: Environmental Assessment, Demolition and Removal of the Borax V Facility.

Date: August 29, 1977

Content: Solid, nonradioactive waste in the form of construction debris was disposed to CFA Landfill II (see Section 3.b).

EG&G Idaho

INTEROFFICE CORRESPONDENCE

date August 30, 1977

to M. E. Eld

from R. W. Passmore R. W. Passmore

subject ENVIRONMENTAL ASSESSMENTS - Pass 100-77

Attached are the revised environmental assessments for (1) Demolition and Removal of the Initial Engine Test (IET) and (2) Demolition and Removal of the Borax V Facility.

These environmental assessments were prepared in accordance with 10CFR, Section 711.25 as required by ERDA-ID Manual 0512.

TGH:lf

Attachments
As stated

cc: T. G. Hedahl
R. H. Meservey
F. H. Tingey
R. W. Passmore file
Central file

FORM EG&G-954
(Rev. 2-77)

ENVIRONMENTAL ASSESSMENT

DEMOLITION AND REMOVAL OF THE BORAX V FACILITY

Revised by: T. G. Hedahl
Date revised: August 29, 1977

TITLE: Demolition and Removal of the Borax V Facility

1. DESCRIPTION OF THE PROPOSED ACTION: This project involves the dismantling and removal of the Borax V process systems and two reactor vessels, and demolition of the facility systems.

   The power plant system will be disassembled and the components decontaminated in place. Salvageable items will be decontaminated as economically practical and surplused for return to the commercial market. The contaminated concrete of the two reactor pits, the water pit, and the equipment pit of the reactor building will be decontaminated in place and used as backfill. The turbine building, reactor building, and cooling tower will also be disassembled.

   Uncontaminated waste materials will be directed to the Central Facilities Area (CFA) Sanitary Landfill for disposal. Contaminated items will be disposed at the Radioactive Waste Management Complex (RWMC). Final site restoration will be conducted following complete removal of the facility.

   The vessels are approximately 300 mR/h on the top flanges. The radiation levels within the vessels are estimated to be several hundred R/h. Actual readings will be verified during D&D activities since concrete demolition is required for access to the vessels.

2. DESCRIPTION OF THE EXISTING ENVIRONMENT: The Borax V facility is located in the southwestern part of the Idaho National Engineering Laboratory (INEL), in the north-central portion of the semiarid eastern Snake River Plain.

   The climate of the region is characterized as a "cool desert" with the vegetation and fauna typical of such a region. During the summer, days are warm, while nights are cool. Winters are cold and dry. The surrounding mountains strongly influence the INEL climate, and cause a southwest wind flow to predominate over most of the Snake River Plain. Nighttime winds are generally out of the northeast.

   The most important element of the surface water hydrology near the facility is the Big Lost River which is located 2.4 km (1.5 mi) to the northwest. The principal ground water feature is the Snake River Plain Aquifer, which underlies the entire eastern Snake River Plain. The depth to this aquifer, at Borax V, is approximately 194 m (635 ft).

   No known endangered species permanently inhabit the INEL site. Populations of small mammals, reptiles, and birds are in sizable abundance. Pronghorn antelope and sage grouse are frequently seen throughout the site. Several migratory species of birds, such as larks, doves, hawks, ducks, geese, and eagles commonly pass over or reside at the INEL.

3. POTENTIAL ENVIRONMENTAL IMPACTS:

   a. CONSTRUCTION: The Borax V area has already been disturbed by construction of existing facilities. Thus, the project should not have a significant additional impact on the existing environment.

      All activities will be conducted in accordance with the Health and Safety regulations issued by the Secretary of Labor in 29 CFR, part 1910 and 1926, and ERDAM-0550-1, report NO. IDO-12028, "Standard Health and Safety Requirements." In addition, work will be performed under close Health Physics surveillance to ensure that work proceeds safely and that no undue personnel exposure or contamination spread occurs.

Explosives may be used to section the concrete structure. The use of explosives for such demolition operations will be limited to times of favorable weather conditions to minimize contamination spread. Explosives will be shipped, stored, and handled in accordance with MD-6, Section 6.15.

b. OPERATION: Contaminated components will be wrapped and sealed in plastic immediately following removal and placed in a designated radioactive storage area pending transport to the RWMC. Catch pans will be used to collect cuttings from all grinding or sawing operations on contaminated components. All solid radioactive waste will be disposed in accordance with MD-8, Section 6.42.

Noncontaminated waste materials will be directed to the CFA Sanitary Landfill in accordance with MD-6, Section 11.12 and MD-8, Section 6.39.

Dust will arise from the demolition and backfill activities. Such a dust problem may be significant due to the contaminated condition of the soil surrounding Borax V. Close Health Physics surveillance and protective personnel clothing and equipment will be necessary to ensure radiological safety.

c. SITE RESTORATION: Upon completion of the dismantling and removal operations, the immediate area will be restored as nearly as possible to its prior state. Grading, grass seeding (crested wheat grass) and landscaping will be necessary to achieve proper restoration.

d. CUMULATIVE AND LONG-TERM ENVIRONMENTAL EFFECTS: The total project should not add significantly to the existing waste disposal facilities. No cumulative or long-term environmental impacts are anticipated. No significant irretrievable or irreversible commitments of natural resources are expected. Any equipment that is still required or can be utilized elsewhere, after the project is completed, could be salvaged for use. However, decontamination procedures may be required before the equipment can be excessed.

4. COORDINATION WITH FEDERAL, STATE, REGIONAL, AND LOCAL PLANS: There are no known conflicts with Federal, state, regional, or local plans and programs.

5. ANTICIPATED BENEFITS AND ALTERNATIVES:

a. BENEFITS: The completion of this $503,000 project will dismantle and remove the Borax V facility and all its support systems and facilities from the reactor area. Since the facility is surplus to the identifiable needs of any ERDA program, such a project will remove a potential radiation and contamination hazard from the environment. The aesthetic impact of the area will also be improved by removal of this decommissioned facility.

b. ALTERNATIVES: Alternatives to this proposed project are as follows:

1. Decontamination of the reactor facility.

2. No-action alternative

A complete decontamination program for the complex would be prohibitively expensive. In addition, many of the components and systems are obsolete or unique to this reactor type. Efforts to find additional uses for the facility have proven unsuccessful. The no-action alternative conflicts with current ERDA policies that require decontamination and removal of surplus contaminated facilities.

The proposed program will provide valuable experience for future D&D programs at the INEL. Therefore, this project is the most practical and feasible choice.

Attachment 9

Subject:	Environmental Assessment, Demolition and Removal of the Initial Engine Test (IET).
Date:	August 29, 1977
Content:	Solid, nonradioactive waste in the form of construction debris was disposed to CFA Landfill II (see Section 3.b).

ENVIRONMENTAL ASSESSMENT

DEMOLITION AND REMOVAL OF THE INITIAL ENGINE TEST (IET)

Revised by: T. G. Hedahl
Date revised: August 29, 1977

TITLE: Demolition and Removal of the Initial Engine Test (IET)

1. DESCRIPTION OF THE PROPOSED ACTION: This project involves the demolition and removal of the IET exhaust stack and monitoring room and the excavation and removal of Hot Waste Tank 319 at Test Area North (TAN). Associated piping, engine exhaust ducting, and 1779 m (5836 ft) of 5 cm (2 in.) pipe will also be included in the removal project.

   Two air handlers and control equipment will be removed from the coupling station and decontaminated as economically feasible. The steel plate shelter will be decontaminated and surplused. The concrete structure of the coupling station will be decontaminated by caustic wash down and surface spalling as required. The contaminated concrete of the test pad drainage trench will also be removed and disposed.

   The exhaust ducting will be disconnected from the exhaust stack and the openings temporarily sealed to minimize the spread of contamination. The ducting will be cut in lengths suitable for handling and disposal at the Radioactive Waste Management Complex (RWMC), and the duct support structures will be transferred to the surplus material yard.

   A 57 m^3 (15,000 gal) hot waste storage tank and associated piping will be excavated and disposed. The 5 cm (2 in.) hot waste drain line, extending from IET to the Test Area North (TAN) valve pit "A", will also be excavated and transported to the RWMC.

   The operational components of this system are contaminated with ^{60}Co, ^{55}Fe, ^{63}Ni, ^{59}Ni, and other unidentified fission products. The transuranic activity level is well below 10 nCi/g.

2. DESCRIPTION OF THE EXISTING ENVIRONMENT: The Initial Engine Test (IET) facility is located in the north-central part of the Idaho National Engineering Laboratory (INEL), in the north-central portion of the semiarid eastern Snake River Plain.

   The climate of the region is characterized as a "cool desert" with the vegetation and fauna typical of such a region. During the summer, days are warm, while nights are cool. Winters are cold and dry. The surrounding mountains strongly influence the INEL climate, and cause a southwest wind flow to predominate over most of the Snake River Plain. Nighttime winds are generally out of the northeast.

   The most important element of the surface hydrology near IET is the Big Lost River Playa which is located 8 km (5 mi) to the southwest. The principal ground water feature is the Snake River Plain Aquifer, which underlies the entire eastern Snake River Plain. The depth to this aquifer, at IET, is approximately 63 m (206 ft).

   No known endangered species permanently inhabit the INEL site. Populations of small mammals, reptiles, and birds are in sizable abundance. Pronghorn antelope and sage grouse are frequently seen throughout the site. Several migratory species of birds, such as larks, doves, hawks, ducks, geese, and eagles commonly pass over or reside at the INEL.

3. POTENTIAL ENVIRONMENTAL IMPACTS:

a. CONSTRUCTION: The IET area has already been previously disturbed by the construction of numerous buildings and facilities. Thus, operations associated with this project are not expected to have a significant additional impact on the existing environment.

All activities will be conducted in accordance with Health and Safety regulations issued by the Secretary of Labor in 29 CFR, part 1910 and 1926, and ERDAM-0550-1, report NO. IDO-12028, Standard Health and Safety Requirements In addition, work will be performed under close Health Physics surveillance. This will ensure that the work proceeds safely and that no undue personnel exposure or contamination spread occurs.

The stack and monitoring room will be demolished by the use of explosives. Demolition operations will be limited to times of favorable weather conditions to minimize contamination spread. Explosives will be shipped, stored, and handled in accordance with MD-6, Section 6.15.

b. OPERATION: Contaminated components will be wrapped and sealed in plastic immediately following removal and placed in a designated Health Physics monitored storage area. Catch pans will be used to collect cuttings from sawing operations on contaminated components. All solid radioactive waste will be disposed in accordance with MD-8, Section 6.42.

Noncontaminated waste materials will be directed to the CFA Sanitary Landfill in accordance with MD-6, Section 11.12 and MD-8, Section 6.39.

Dust will arise from the excavation and backfill activities. Considerable contamination is present in the 9.3 m^2 (100 ft) IET valve pit area with levels up to 6 mR/h. The waste lines have apparently leaked into the pit suggesting that contamination may be present along other sections of the hot waste drain line. Excavation and backfill operations, if leakage has occurred, will have to be conducted during favorable weather conditions and under close Health Physics surveillance and procedures. The area may have to be moistened with water to reduce airborne contamination spread.

c. SITE RESTORATION: At the completion of demolition activities and the disposal of waste, the D&D work areas will be radiologically surveyed and the surface will be skimmed if necessary. All excavations will be backfilled and graded to surrounding contours. Crested wheat grass will be planted in all disturbed earth areas.

d. CUMULATIVE AND LONG-TERM ENVIRONMENTAL EFFECTS: The total project should not add significantly to the existing waste disposal facilities. No cumulative or long-term environmental impacts are anticipated. No significant irretrievable or irreversible commitments of natural resources are expected. Any equipment that is still required or can be utilized elsewhere, after the project is completed, could be salvaged for use. However, decontamination procedures may be required before the equipment can be excessed.

4. COORDINATION WITH FEDERAL, STATE, REGIONAL, AND LOCAL PLANS: There are no known conflicts with Federal, state, regional, or local plans and programs.

5. ANTICIPATED BENEFITS AND ALTERNATIVES:

a. BENEFITS: The completion of this $164,000 project will dismantle and remove the Initial Engine Test facility and its support systems. Since the system is surplus to the identifiable needs of any ERDA program, such a project will remove a potential radiation and contamination hazard from the environment.

b. ALTERNATIVES: Alternatives to the proposed project are as follows:

(1) Decontamination of the IET facility

(2) No-action alternative

A complete decontamination program for the entire system would be prohibitively expensive. In addition, many of the system components are no longer useful, and therefore, no attempts will be made to surplus them. The no-action alternative conflicts with current ERDA policies that require decontamination and removal of surplus contaminated facilities.

The proposed program will provide valuable experience for future D&D programs at the INEL. Therefore, this project is the most practical and feasible choice.

Attachment 10

Subject:	Environmental Assessment, Decontamination of the Hallam Reactor Components.
Date:	August 24, 1977
Content:	Solid, nonradioactive waste in the form of construction debris was disposed to CFA Landfill II (see Section 3.b).

ENVIRONMENTAL ASSESSMENT

DECONTAMINATION OF THE HALLAM REACTOR COMPONENTS

Revised by: T. G. Hedahl
Date revised: August 24, 1977

TITLE: Decontamination of the Hallam Reactor Components

1. DESCRIPTION OF THE PROPOSED ACTION: This project involves the decontamination of the excessed Hallam Reactor Components. These components have been stored in the Hanger Building at Test Area North (TAN) since the fall of 1971. The proposal will allow the materials to be returned to commercial use or will prepare them for disposal at the INEL Radioactive Waste Management Complex (RWMC). The components were sent to the INEL for storage following the dismantling of the Hallam Nuclear Power Facility in Hallam, Nebraska. Included are the following items:

   (1) Five intermediate heat exchangers contaminated with up to 59 kg (130 lb) of radioactive sodium each;

   (2) Three disassembled primary coolant pumps contaminated with a sodium film;

   (3) Three steam generator heat exchangers containing possible pockets of sodium up to 45 kg (100 lb) total;

   (4) Three steam generator evaporators containing possible pockets of sodium up to 45 kg (100 lb) total;

   (5) Three air eliminators containing possible pockets of sodium up to 45 kg (100 lb) total;

   (6) One 35.6-cm (14 in.) flow meter contaminated with a sodium film.

   The radiation levels associated with these components range from 0.5 mR/h to 1.5 mR/h at the surface. Analysis indicates that the contaminants are approximately 58% ^{60}Co, 42% ^{137}Cs, and some ^{22}Na. This proposed action will attempt to return these components to productive use and will release the space now committed to their storage.

   The EBR-I NaK Disposal Facility and process activities will serve as the design guidelines during the decontamination operations. Provisions will be made for manually actuated remote control of the reaction system, personnel, and radiological safety, and the collection and processing of the contaminated gaseous and liquid effluent generated by the Na-steam reaction. The reaction agents will be dry steam, saturated steam, gaseous nitrogen (gN_2) and water. Gaseous nitrogen and water will be used to flush and purge the components. Figure 1 is a conceptual schematic of the sodium disposal system.

2. DESCRIPTION OF THE EXISTING ENVIRONMENT: The Test Area North (TAN) is located in the north-central part of the Idaho National Engineering Laboratory (INEL), in the north-central portion of the semiarid eastern Snake River Plain.

   The climate of the region is characterized as a "cool desert" with the vegetation and fauna typical of such a region. During the summer, days are warm, while nights are cool. Winters are cold and dry. The surrounding mountains strongly influence the INEL climate, and cause a southwest wind flow to predominate over most of the Snake River Plain. Nighttime winds are generally out of the northeast.

The most important element of the surface water hydrology near TAN is the Big Lost River Playa which is located 6.4 km (4 mi) to the southwest. The principal ground water feature is the Snake River Plain Aquifer, which underlies the entire eastern Snake River Plain. The depth to this aquifer, at TAN is approximately 63 m (206 ft).

No known endangered species permanently inhabit the INEL site. Populations of small mammals, reptiles, and birds are in sizable abundance. Pronghorn antelope and sage grouse are frequently seen throughout the site. Several migratory species of birds, such as larks, doves, hawks, ducks, geese, and eagles commonly pass over or reside at the INEL.

3. POTENTIAL ENVIRONMENTAL IMPACTS:

a. CONSTRUCTION: The TAN area has already been previously disturbed by the construction of numerous buildings and facilities. Thus, operations associated with this project are not expected to have a significant additional impact on the existing environment.

All activities will be conducted in accordance with the Health and Safety regulations issued by the Secretary of Labor in 29 CFR, Part 1910 and 1926, and ERDAM-0550-1, report NO. IDO-12028, "Standard Health and Safety Requirements." In addition, work will be performed under close Health Physics surveillance. This will ensure that the work proceeds safely and that no undue personnel exposure or contamination spread occurs.

Precautions will be maintained during the sodium reactions to prevent explosion risks. Dry gaseous nitrogen will be purged through the components to reduce the oxygen content to <1%. Heated wet nitrogen gas will be used to flush the systems. Steam will be used to complete the sodium reaction and to ensure that all the caustic material is eliminated. Monitoring for hydrogen,temperature, and PH levels will be conducted to ensure personnel safety and complete sodium removal.

b. OPERATION: The steam and gas flow paths through the components will be manually connected to the process system using leaktite connections. All gaseous exit lines will be passed through a HEPA filter to prevent the spread of airborne contamination. The exit gas will be burned in a flame curtain to prevent hydrogen buildup. Steam injection will be controlled by a manually operated flow regulating valve. All caustic liquid effluent generated by the reaction will be transferred to a holding tank for processing.

The contaminated liquid effluent will be shipped to the Chemical Processing Plant (CPP) and converted to solid form, in accordance with MD-6, Section 11.21. The solid contaminated material will then be placed in 0.21 m^3 (55 gal) drums and transported to the RWMC for disposal.

Solid radioactive waste will be generated following the decontamination procedures. Such waste, which will primarily be the dismantled process system components, will be disposed in accordance with MD-8, Section 6.42.

c. SITE RESTORATION: The surrounding ground area, protective barriers, and enclosures will be decontaminated in place or packaged and transported to the RWMC. A final Health Physics survey will be made and general area restoration will be performed following disposal operations.

d. CUMULATIVE AND LONG-TERM ENVIRONMENTAL EFFECTS: The total project should not add significantly to the existing disposal facilities. It is anticipated that no cumulative or long-term environmental impacts will result. There should be no significant irretrievable or irreversible commitments of natural resources involved with the project. Any equipment that is still required or can be utilized elsewhere after the project is no longer in operation could be salvaged for use. However, decontamination procedures may be required before the equipment can be excessed.

4 COORDINATION WITH FEDERAL, STATE, REGIONAL, AND LOCAL PLANS: There are no known conflicts with Federal, state, regional, or local plans and programs.

5. ANTICIPATED BENEFITS AND ALTERNATIVES:

BENEFITS: This action (projected cost, $225,000) will remove from man's environment a potential radiation and contamination hazard. Decontamination of the Hallam components will preclude future potential exposures to the public from this source of radiation. Further, their removal, after decontamination and removal of residual sodium, from the TAN storage area will make this area available for more productive use.

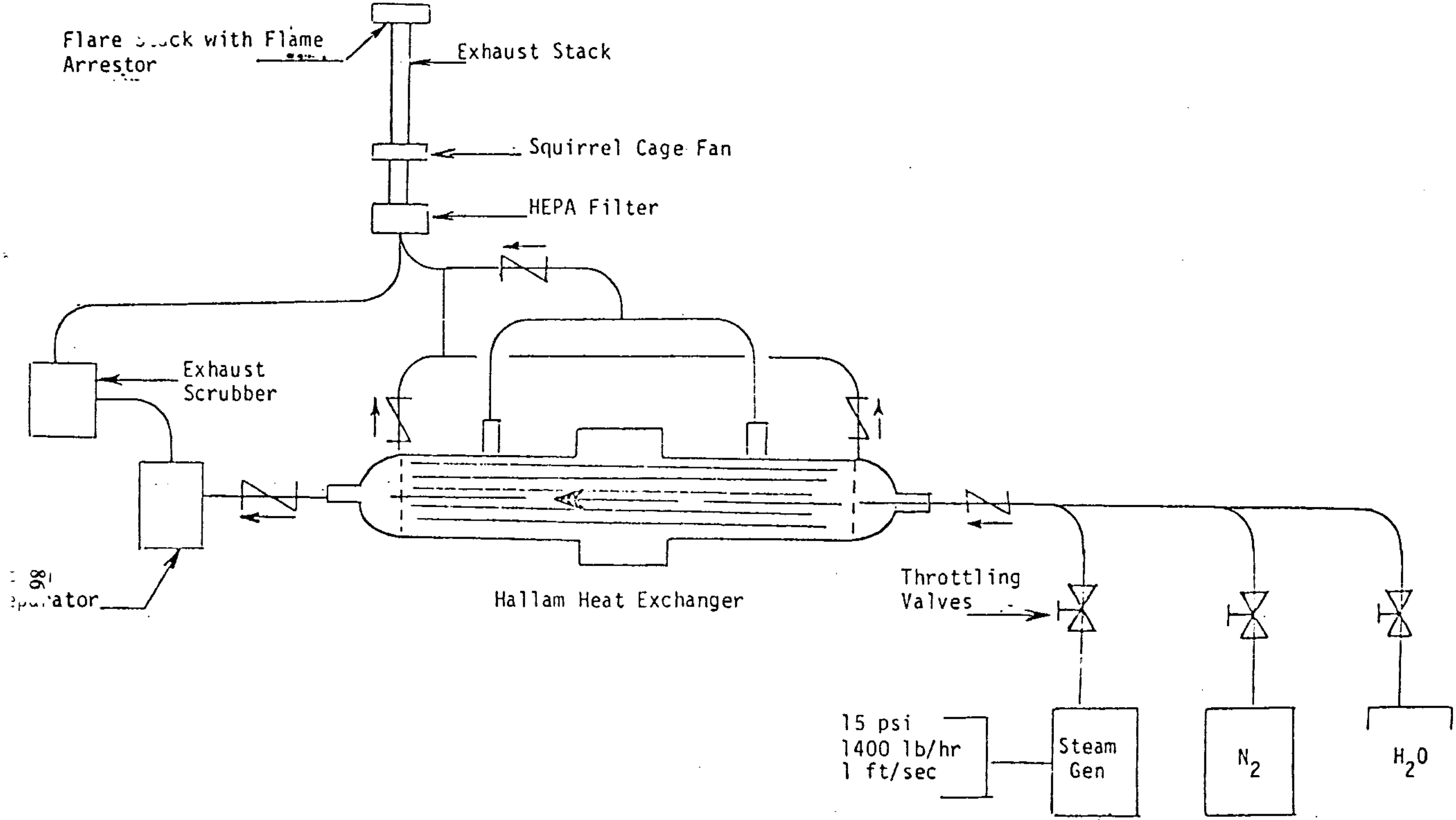
ALTERNATIVES: An alternative to this proposed action is to relocate these components in another facility that is presently surplus. Such an action might appear attractive in that it would return to use an unused facility and eliminate the need to decontaminate the components. However, this alternative is not considered viable because:

(1) The size of the components make locating a facility of sufficient size unlikly.

(2) Ultimately the decontamination, or final disposition, of the components would have to be considered. It is likely that the cost of such an action could only escalate over the present estimated cost of performing the action now.

A second alternative considered is to place the components up for commercial bid for reuse or salvage as scrap, making a condition of bidding the removal, in an intact condition, of the Hallam components from the INEL. Although this is attractive from several aspects, difficulties in such an action might arise in ensuring that potential bidders have the capability and necessary licenses to ship, receive, and decontaminate large radioactive items.

A final alternative would be to leave the components intact in the present location. To do so, however, would be to continue the presence of a potential radiation and contamination source. This is contrary to the stated ERDA objective to decontaminate and remove any surplus contaminated facility.



CONCEPTUAL SCHEMATIC
SODIUM DISPOSAL

Fig. 1

Attachment 11

Subject:	Environmental Assessment, Dismantling and Demolition of the Organic Moderated Reactor Experiment (ORME).
Date:	August 23, 1977
Content:	Solid, nonradioactive waste in the form of construction debris was disposed to CFA Landfill II (see Section 3.b).

ENVIRONMENTAL ASSESSMENT

DISMANTLING AND DEMOLITION OF THE

ORGANIC MODERATED REACTOR EXPERIMENT (OMRE)

Revised by: T. G. Hedahl
Date revised: August 23, 1977

TITLE: Dismantling and Demolition of the Organic Moderated Reactor Experiment

1. DESCRIPTION OF THE PROPOSED ACTION: The project involves the dismantling and demolition of the Organic Moderated Reactor Experiment (OMRE) facility. This includes removal of the reactor vessel and all underground storage tanks. The project entails removal of contaminated and noncontaminated systems and subsequent disposal operations.

   Project operations will involve dismantling or removing the following items:

   a. Contaminated:

      1. Miscellaneous hardware and system components.

      2. Particulate loops, air blast heat exchanger, and the primary loop.

      3. Process piping and the purification and coolant make-up systems.

      4. Reactor vessel and drain tank, vessel shelter, pipe gallery and the reactor component storage pit.

      5. Waste tank and the IRL drain tank.

   b. Non-Contaminated:

      1. Process water and sanitary waste disposal systems.

      2. Metal building structure, frame, and slab floors.

      3. Fuel oil and gasoline tanks.

      4. Transformer structure and pole line

      5. Parking area and roadway.

   Disposal operations will involve waste shipment to the Radioactive Waste Management Complex (RWMC) and the Central Facilities Area (CFA) sanitary landfill. Noncontaminated salvageable materials will be transferred to the excess materials warehouse.

2. DESCRIPTION OF THE EXISTING ENVIRONMENT: The OMRE facility is located in the southwestern part of the Idaho National Engineering Laboratory (INEL), in the north-central portion of the semiarid eastern Snake River Plain.

   The climate of the region is characterized as a "cool desert" with the vegetation and fauna typical of such a region. During the summer, days are warm, while nights are cool. Winters are cold and dry. The surrounding mountains strongly influence the INEL climate, and cause a southwest wind flow to predominate over most of the Snake River Plain. Nighttime winds are generally out of the northeast.

   The most important element of the surface water hydrology near OMRE is the Big Lost River which is located 8.8 km (5.5 mi) to the northwest. The principal ground water feature is the Snake River Plain Aquifer, which underlies the entire eastern Snake River Plain. The depth to this aquifer, near OMRE is approximately 145 m (475 ft).

No known endangered species permanently inhabit the INEL site. Populations of small mammals, reptiles, and birds are in sizable abundance. Pronghorn antelope and sage grouse are frequently seen throughout the site. Several migratory species of birds, such as larks, doves, hawks, ducks, geese, and eagles commonly pass over or reside at the INEL.

3. POTENTIAL ENVIRONMENTAL IMPACTS:

a. CONSTRUCTION: The OMRE area has already been disturbed by construction of existing facilities. Thus, the project should not have a significant additional impact on the existing environment.

All activities will be conducted in accordance with the Health and Safety regulations issued by the Secretary of Labor in 29 CFR, Part 1910 and 1926, and ERDAM-0550-1, report NO. IDO-12028, "Standard Health and Safety Requirements." In addition; work will be performed under close Health Physics surveillance to ensure that work proceeds safely and that no undue personnel exposure or contamination spread occurs.

To expedite removal operations and to minimize the potential spread of contamination, piping and loop systems will be removed in the largest sections possible and transported to the RWMC for disposal. Any explosion hazards associated with the removal of the empty fuel tanks will be eliminated by filling the tanks with water prior to removal. The use of explosives for demolition of the concrete structure will be limited to times of favorable weather conditions to minimize contamination spread.

b. OPERATION: The radiation level of the reactor vessel is in excess of 300 R/h at the core elevation. Detailed operational procedures will be prepared and approved for the one piece removal and transportation of the vessel. All solid radioactive waste will be disposed in accordance with MD-8, Section 6.42.

Noncontaminated, waste materials will be directed to the CFA sanitary landfill in accordance with MD-6, Section 11.12 and MD-8, Section 6.39.

Consideration will have to be given to the hard organic residue that is contained in the various piping and loop systems. This santo wax or glyptol varnish residue may tend to flow when temperatures are increased following disposal at the RWMC. Contamination spread could occur in the ground if the residue begins to flow out of the open-end pipe sections. The pipe sections may have to be sealed prior to disposal.

c. SITE RESTORATION: Upon completion of the dismantling and removal operations, the immediate area will be restored as nearly as possible to its prior state. Grading, grass seeding, and landscaping will be necessary to achieve proper restoration.

d. CUMULATIVE AND LONG-TERM ENVIRONMENTAL EFFECTS: The total project should not add significantly to the existing waste disposal facilities. No cumulative or long-term environmental impacts are anticipated. No significant irretrievable or irreversible commitments of natural resources are expected. Any equipment that is still required or can be utilized elsewhere, after the project is completed, could be salvaged for use. However, decontamination procedures may be required before the equipment can be excessed.

4. COORDINATION WITH FEDERAL, STATE, REGIONAL, AND LOCAL PLANS: There are no known conflicts with Federal, state, regional, or local plans and programs.

5. ANTICIPATED BENEFITS AND ALTERNATIVES:

a. BENEFITS: The completion of this $724,000 project will dismantle and remove the OMRE reactor and all its support systems and facilities from the reactor area. Since the facility is surplus to the identifiable needs of any ERDA program, such a project will remove a potential radiation and contamination hazard from the environment. The aesthetic impact of the area will also be improved by removal of this decommissioned facility.

b. ALTERNATIVES: Alternatives to this proposed project are as follows:

1. Decontamination of the reactor facility

2. No-action alternative

A complete decontamination program for the complex would be prohibitively expensive. In addition, many of the components and systems are obsolete or unique to this reactor type. Efforts to find additional uses for the facility have proven unsuccessful. The no-action alternative conflicts with current ERDA policies that require decontamination and removal of surplus contaminated facilities.

The proposed program will provide valuable experience for future D&D programs at the INEL. Therefore, this project is the most practical and feasible choice.

Attachment 12

Subject:	Environmental Assessment, Dismantling and Decontamination of the TAN Radioactive Waste Evaporation System.
Date:	August 25, 1977
Content:	Solid, nonradioactive waste in the form of construction debris was disposed to CFA Landfill II (see Section 3.b).

ENVIRONMENTAL ASSESSMENT

DISMANTLE AND DECONTAMINATION OF THE TAN RADIOACTIVE WASTE EVAPORATION SYSTEM

Revised by: T. G. Hedahl
Date revised: August 25, 1977

TITLE: Dismantle and Decontamination of the TAN Radioactive Waste Evaporation System (PM-2A)

1. DESCRIPTION OF THE PROPOSED ACTION: The project includes the excavation and removal of the Test Area North (TAN) Radioactive Waste Evaporation System (PM-2A) which consists of tanks #709 and #710, each having a capacity of 190 m^3 (50,000 gal).

   The excavation operations will also include the removal of approximately 30 m (98 ft) of 0.1 m (0.33 ft) diameter pipe, and the entombment of approximately 350 m (1148 ft) of double run 0.1 m (0.33 ft) diameter pipe. The buried pipe system running from tanks #709 and #710 to the building TAN-616 will be entombed by filling the pipes with grout.

   Solidification of the fluids in the tanks will be accomplished by injecting sodium silicate solution into the sludge at eight locations per tank. An aluminum sulfate solution will be sprayed over the surface of the sludge. The solidification agents mixture ratio is 3.22:1 (sodium silicate to aluminum sulfate).

   All above ground systems, such as the evaporator tankage, control system, interconnecting piping, and the cement block shielding wall, will be removed or demolished. In addition, approximately 4645 m^2 (50,000 ft^2) of contaminated soil surrounds the PM-2A tanks which will have to be contained, stabilized, or disposed.

   The operational components of this system are contaminated with ^{137}Cs, ^{60}Co, ^{144}Ce, ^{154}Eu, ^{54}Mn, ^{106}Ru, ^{90}Sr, and other fission products. Concentrations range from 2×10^{-6} µCi/ml in Tank No. 709 to 1.32 µCi/ml in Tank No. 710. The radiation level is 200 mR/hr at the tank manway flanges and 500 mR/hr at the surface of the sludge. The transuranic activity level is well below 10 nCi/g.

2. DESCRIPTION OF THE EXISTING ENVIRONMENT: The Test Area North (TAN) is located in the north-central part of the Idaho National Engineering Laboratory (INEL), in the north-central portion of the semiarid eastern Snake River Plain.

   The climate of the region is characterized as a "cool desert" with the vegetation and fauna typical of such a region. During the summer, days are warm, while nights are cool. Winters are cold and dry. The surrounding mountains strongly influence the INEL climate, and cause a southwest wind flow to predominate over most of the Snake River Plain. Nighttime winds are generally out of the northeast.

   The most important element of the surface water hydrology near TAN is the Big Lost River Playa which is located 6.4 km (4 mi) to the southwest. The principal ground water feature is the Snake River Plain Aquifer, which underlies the entire eastern Snake River Plain. The depth to this aquifer, at the TAN is approximately 63 m (206 ft).

   No known endangered species permanently inhabit the INEL site. Populations of small mammals, reptiles, and birds are in sizable abundance. Pronghorn antelope and sage grouse are frequently seen throughout the site. Several migratory species of birds, such as larks, doves, hawks, ducks, geese, and eagles commonly pass over or reside at the INEL.

3. POTENTIAL ENVIRONMENTAL IMPACTS:

CONSTRUCTION: The TAN area has already been previously disturbed by the construction of numerous buildings and facilities. Thus, operations associated with this project are not expected to have a significant additional impact on the existing environment.

All activities will be conducted in accordance with Health and Safety regulations issued by the Secretary of Labor in 29 CFR, Part 1910 and 1926, and ERDAM-0550-1, report NO. IDO-12028, "Standard Health and Safety Requirements." In addition, work will be performed under close Health Physics surveillance. This will ensure that the work proceeds safely and that no undue personnel exposure or contamination spread occurs.

A coating of non-flammable "Contamafix" will be sprayed on the inner surface of each tank and solidified sludge. The tanks will be visually inspected to determine corrosion damage and to evaluate the structural integrity of each tank.

OPERATION: A HEPA filter will be placed at the downstream end of each piping run to prevent the spread of contamination caused by the flow of grout into the pipes.

The removal of fencing and contaminated soil are included within the scope of this project. Wherever practical, materials will be decontaminated and retained for their salvage value. All solid radioactive waste will be disposed in accordance with MD-8, Section 6.42.

Noncontaminated, waste materials will be directed to the CFA Sanitary Landfill in accordance with MD-6, Section 11.12 and MD-8, Section 6.39.

The buried pipe system will be entombed by grouting and the pipe ends will be seal-welded closed to prevent contamination spread.

Dust will arise from the excavation and backfill activities. Due to the contaminated condition of the soil, such a dust problem may be significant. Excavation and backfill operations will have to be conducted during favorable weather conditions and under close Health Physics surveillance and procedures. The excavation required for this project will also extend to approximately the center of the Snake Avenue roadbed. Traffic will be rerouted to the service road on the north side of the security fence.

It will be recommended that filters be placed on all excavation equipment to prevent interior contamination of the equipment. The area should be moistened with water to reduce airborne contamination spread. An air support weather shield may have to be erected over the excavation area to ensure personnel and environmental safety. Lastly, it is recommended that markers be placed above the buried entombed pipes. These markers will be useful for exact identification of the contaminated pipes if future excavation is required in the area.

c. SITE RESTORATION: All contaminated earth will be removed, backfilled and leveled to match the surrounding area. The asphalt of Snake Avenue that was damaged by excavation will be resurfaced. A health physics survey will be conducted over the PM-2A fenced area and an area extending 10 m (33 ft) outward from the fence and the earth surface will be skimmed as needed. All work areas will then be seeded with crested wheat grass.

d. CUMULATIVE AND LONG-TERM ENVIRONMENTAL EFFECTS: The total project should not add significantly to the existing waste disposal facilities. No cumulative or long-term environmental impacts are anticipated. No significant irretrievable or irreversible commitments of natural resources are expected. Any equipment that is still required or can be utilized elsewhere, after the project is completed, could be salvaged for use. However, decontamination procedures may be required before the equipment can be excessed.

4. COORDINATION WITH FEDERAL, STATE, REGIONAL, AND LOCAL PLANS: There are no known conflicts with Federal, state, regional, or local plans and programs.

5. ANTICIPATED BENEFITS AND ALTERNATIVES:

BENEFITS: The completion of this $516,000 project will dismantle and remove the TAN Radioactive Waste Evaporation System (PM-2A) and its support systems. Since the system is surplus to the identifiable needs of any ERDA program, such a project will remove a potential radiation and contamination hazard from the environment.

ALTERNATIVES: Alternatives to the proposed project are as follows:

(1) Decontamination of the evaporation system

(2) No-action alternative

A complete decontamination program for the entire system would be prohibitively expensive. In addition, many of the system components are no longer useful, and therefore, no attempts will be made to surplus them. The no-action alternative conflicts with current ERDA policies that require decontamination and removal of surplus contaminated facilities.

The proposed program will provide valuable experience for future D&D programs at the INEL. Therefore, this project is the most practical and feasible choice.

Attachment 13

Subject:	Environmental Assessment, CF-688 Modifications.
Date:	August 25, 1977
Content:	Solid, nonradioactive waste in the form of construction debris was disposed to CFA Landfill II (see Section 3.b).

ENVIRONMENTAL ASSESSMENT

CF-688 MODIFICATIONS

Prepared by: T. G. Hedahl
Date prepared: August 25, 1977

TITLE: CF-688 Modifications

1. DESCRIPTION OF THE PROPOSED ACTION: This project involves the remodeling of building CF-688 at the Central Facilities Area (CFA) of the Idaho National Engineering Laboratory (INEL). Modifications will provide necessary piping for both water and drains, a compressed air distribution system, and ventilation and air conditioning systems. Architectural changes will include changing door openings and walls, installation of a new floor, roof, and concrete block wall, installation of new insulation and ceiling surfaces, and installation of miscellaneous mechanical equipment such as sinks, fans, and fume exhaust hoods.

The modifications will allow for approximately 2787 m^2 (9000 ft^2) of office space. Such modifications will provide laboratory space to consolidate, upgrade and expand Instrumentation and Control Laboratories at the INEL. The implementation of this proposal will complete the air conditioning, electrical, water, air and gas portions of the proposal for proper operations of the laboratory. The following work is required to remodel CF-688 to accomodate Instrumentation and Control Laboratories:

1. Remove 128 m (420 ft) of existing stud wall.

2. Construct 18.3 m (60 ft) of new stud wall.

3. Construct 10.4 m^2 (112 ft^2) of new ceiling and install 111.5 m^2 (1 200 ft^2) of 15 cm (6 in.) insulation.

4. Install and/or relocate 8 new doors.

5. Construct new foundation, block wall, roof and place new floor on existing slab. Relocate existing ladder and roof drain line.

6. Provide and install stainless steel sink, counters, emergency eye wash and shower, chemical hold and drain system, and hood over shop sinks and solvent/cleaning area.

7. Provide and install cold water and drains to the following:

   a. Brew furnace.

   b. Chemical room fume hood.

   c. Ambient temperature flow loop area

   d. Two chemical storage benches.

   e. The emergency eye wash and shower.

8. Extend the refrigeration type air conditioning in assembly area to include the laser room to maintain humidity less than 35% and temperature of 20°C $\pm$ 1-1/2° (68°F $\pm$ 1-1/2°).

9. Provide and install vent system to vent curing ovens so that heat will go outside the building during warm weather and inside during cold weat

10. Provide and install 620 kPa (90 psi) oil free instrument quality air system and a storage tank which will be an existing one from ARA III.

11. Install darkroom sink, exhaust vent system, and darkroom counter. Units will be existing ones from ARA III.

12. Install a government furnished 19 L (5 gal) per hour water still.

13. Provide and install vacuum exhaust system to remove smoke generated by mills, laths, and grinders.

14. Provide and install vent system to vent the flame spray booth and welders.

15. Provide and install chemical fume hood bench enclosure in the chemical room.

2. DESCRIPTION OF THE EXISTING ENVIRONMENT: The Central Facilities Area (CFA) is located in the southwestern part of the Idaho National Engineering Laboratory (INEL), in the north-central portion of the semiarid eastern Snake River Plain.

The climate of the region is characterized as a "cool desert" with the vegetation and fauna typical of such a region. During the summer, days are warm, while nights are cool. Winters are cold and dry. The surrounding mountains strongly influence the INEL climate, and cause a southwest wind flow to predominate over most of the Snake River Plain. Nighttime winds are generally out of the northeast.

The most important element of the surface water hydrology near CFA is the Big Lost River which is located 6.4 km (4 mi) to the northwest. The principal ground water feature is the Snake River Plain Aquifer, which underlies the entire eastern Snake River Plain. The depth to this aquifer, at CFA is approximately 155 m (510 ft).

No known endangered species permanently inhabit the INEL site. Populations of small mammals, reptiles, and birds are in sizable abundance. Pronghorn antelope and sage grouse are frequently seen throughout the site. Several migratory species of birds, such as larks, doves, hawks, ducks, geese, and eagles commonly pass over or reside at the INEL.

3. POTENTIAL ENVIRONMENTAL IMPACTS:

a. CONSTRUCTION: Since the CF area has already been previously disturbed by the construction of numerous buildings and facilities, the project should not have a significant additional impact on the existing environment.

Solid, nonradioactive waste, primarily in the form of construction debris, will be generated. Such waste will be disposed in accordance with MD-8, Section 6.39 and MD-6, Section 11.12.

A short-term impact will occur during construction involving the cut-off of water and electrical services for a short period of time to allow for new utility installation into the existing lines. Noise levels will increase during the construction period which may be distracting to some of the nearby offices. However, noise levels will not be of a hazardous nature.

b. OPERATION: This proposal will not alter the essential features of water and air pollution control at the INEL. Sanitary liquid and sewage waste will be generated after construction is completed. Sanitary liquid waste will be disposed in existing sewage systems in accordance with MD-6, Sections 11.22 and 8.12. The project will not add significantly to the various existing disposal and utility systems in CFA.

A cleaning area will be installed in the laboratory to handle various toxic liquid waste, (dilute acids, organics), that may be used. This waste will flow into a toxic storage tank for processing and disposal. Any chemical effluents will be disposed in accordance with MD-6, Section 11.22 and MD-8, Section 6.30. Hoods will be required where welding and certain chemical techniques are performed, to assure occupational safety from airborne particulates and gases. All airborne effluents from venting and exhaust systems will be in compliance with State administered EPA guidelines.

c. SITE RESTORATION: Upon completion of the laboratory modification, the immediate area surrounding the structure will be restored to as near as possible to its prior state.

d. CUMULATIVE AND LONG-TERM ENVIRONMENTAL EFFECTS: It is anticipated that no cumulative or long-term environmental impacts will result from this project. There should be no significant irretrievable or irreversible commitments of natural resources involved in the project. Any equipment that is still needed or can be utilized after the laboratory is no longer in operation could be salvaged for use elsewhere.

4. COORDINATION WITH FEDERAL, STATE, REGIONAL OR LOCAL PLANS: There are no known conflicts with Federal, state, regional, or local plans and programs.

5. ANTICIPATED BENEFITS AND ALTERNATIVES:

BENEFITS: The completion of this $160.000 project would provide laboratory space to consolidate, upgrade, and expand Instrumentation and Control Laboratories at the INEL. The location at CF-688-689 is the result of an EG&G evaluation of options to obtain additional space for instrumentation and control laboratories. The modifications are designed to solve immediate laboratory needs in the quickest and most efficient manner.

ALTERNATIVES: The alternatives investigated were the leasing of space in Idaho Falls, Idaho, contracting out portions of the laboratory functions, installing trailer units and erecting prefabricated buildings. The conclusion of the investigation was that the most cost effective and efficient solution was to remodel CF-688-689. Since the Technical Library presently in CF-689 will be moving into new facilities in Idaho Falls, relocation of personnel will be lowered. Trailers are not suitable for lab space and prefabricated buildings would increase cost beyond feasible funding levels. A no-action alternative would hinder the expansion and improvements for development of adequate instrumentation equipment. Therefore, the proposed project is the most practical and feasible choice.

Attachment 14

Subject:	Environmental Assessment, Electrical Power Upgrade at CF-688.
Date:	August 26, 1977
Content:	Solid, nonradioactive waste in the form of construction debris was disposed to CFA Landfill II (see Section 3.b).

ENVIRONMENTAL ASSESSMENT

ELECTRICAL POWER UPGRADE AT CF-688

Prepared by: T. G. Hedahl
Date prepared: August 26, 1977

TITLE: Electrical Power Upgrade at CF-688

1. DESCRIPTION OF THE PROPOSED ACTION: This project involves the expansion of the electrical distribution system at the Central Facilities Area Building, CF-688, at the Idaho National Engineering Laboratory (INEL).

   The work required to upgrade the electrical power distribution system is as follows:

   a. Remove receptacles, telephone outlets and wiring back to the junction boxes of circuits no longer required.

   b. Provide and install six power panels.

   c. Provide and install a 600 amp. distribution panel.

   d. Provide and install a 300 KVA dry type transformer.

   e. Provide and install switches for vent fans.

   f. Provide and install warning lights in the laser area.

   g. Provide and install all receptacles and associated wiring, breakers, controls and junction boxes.

   It is proposed that the panels and transformer be located in the existing basement tunnel. There is ample room and accessibility at feeder locations to tie into new branch circuits and to provide balanced loads.

2. DESCRIPTION OF THE EXISTING ENVIRONMENT: The Central Facilities Area (CFA) is located in the southwestern part of the Idaho National Engineering Laboratory (INEL), in the north-central portion of the semiarid eastern Snake River Plain.

   The climate of the region is characterized as a "cool desert" with the vegetation and fauna typical of such a region. During the summer, days are warm, while nights are cool. Winters are cold and dry. The surrounding mountains strongly influence the INEL climate, and cause a southwest wind flow to predominate over most of the Snake River Plain. Nighttime winds are generally out of the northeast.

   The most important element of the surface water hydrology near CFA is the Big Lost River which is located 6.4 km (4 mi) to the northwest. The principal ground water feature is the Snake River Plain Aquifer, which underlies the entire eastern Snake River Plain. The depth to this aquifer, at CFA,is approximately 155 m (510 ft).

   No known endangered species permanently inhabit the INEL site. Populations of small mammals, reptiles, and birds are in sizable abundance. Pronghorn antelope and sage grouse are frequently seen throughout the site. Several migratory species of birds, such as larks, doves, hawks, ducks, geese, and eagles commonly pass over or reside at the INEL

3. POTENTIAL ENVIRONMENTAL IMPACTS:

   a. CONSTRUCTION: Since the CF area has already been previously disturbed by the construction of numerous buildings and facilities, the project should not have a significant additional impact on the existing envrionment.

Some solid, nonradioactive waste, primarily in the form of construction debris, will be generated. Such waste will be disposed in accordance with MD-8, Section 6.39 and MD-6, Section 11.12.

A short-term impact will occur during construction involving the cut-off of water and electrical services for a short period of time to allow for new utility installation into the existing lines. Noise levels will increase during the construction period which may be distracting to some of the nearby offices. However, noise levels will not be of a hazardous nature.

b. OPERATION: This proposal will not alter the essential features of water and air pollution control at the INEL. The project will not add significantly to the various existing disposal and utility systems in CFA.

c. SITE RESTORATION: Upon completion of the laboratory modification, the immediate area surrounding the structure will be restored to as near as possible to its prior state.

d. CUMULATIVE AND LONG-TERM ENVIRONMENTAL EFFECTS: It is anticipated that no cumulative or long-term environmental impacts will result from this project. There should be no significant irretrievable or irreversible commitments of natural resources involved in the project. Any equipment that is still needed or can be utilized elsewhere after the laboratory is no longer in operation could be salvaged for use.

4. COORDINATION WITH FEDERAL, STATE, REGIONAL OR LOCAL PLANS: There are no known conflicts with Federal, state, regional, or local plans and programs.

5. ANTICIPATED BENEFITS AND ALTERNATIVES:

a. BENEFITS: The completion of this $70,000 project would provide laboratory space to consolidate, upgrade, and expand Instrumentation and Control Laboratories at the INEL. The location at CF-688-689 is the result of an EG&G evaluation of options to obtain additional space for instrumentation and control laboratories. The modifications are designed to solve immediate laboratory needs in the quickest and most efficient manner. This portion of the total modifications will provide sufficient electrical capacity for operation of high power demand equipment needed in the lab.

b. ALTERNATIVES: The alternatives investigated were the leasing of space in Idaho Falls, Idaho, contracting out portions of the laboratory functions, installing trailer units and erecting prefabricated buildings. The conclusion of the investigation was that the most cost effective and efficient solution was to remodel CF-688/689. Since the Technical Library presently in CF-689 will be moving into new facilities in Idaho Falls, relocation of personnel will be lowered. Trailers are not suitable for lab space and prefabricated buildings would increase cost beyond feasible funding levels.

A no-action alternative would hinder the expansion and improvements for development of adequate instrumentation equipment. Therefore, the proposed project is the most practical and feasible choice.

Attachment 15

Subject:	Environmental Assessment, CF-689 Modifications for Instrumentation and Control Lab.
Date:	August 8, 1977
Content:	Solid, nonradioactive waste in the form of construction debris was disposed to CFA Landfill II (see Section 3.b).

ENVIRONMENTAL ASSESSMENT

CF 689 MODIFICATIONS FOR INSTRUMENTATION AND CONTROL LAB

Prepared by: T. G. Hedahl
Date prepared: August 8, 1977

TITLE: CF 689 Modifications for Instrumentation and Control Lab

1. DESCRIPTION OF THE PROPOSED ACTION:

The project consists of the design, demolition, and construction necessary to remodel the existing first floor of building CF 689 to accommodate an instrumentation assembly area at the Central Facilities Area (CFA) of the Idaho National Engineering Laboratory (INEL).

This proposal will require modification of the existing ventilation system by installing a refrigeration type system (see Sketches 3 and 4); installation of instrumentation air and welding gas systems (see Sketch 2); repiping to supply cooling water to curing ovens (see Sketch 2);removing and installing new doors, walls, and ceilings in some areas (see Sketch 1); and modifying the electrical system by installing a new transformer, panels and circuits.

Specifically, the following actions constitute this proposal:

a. Remove approximately 73 m (240 ft.) of stud wall.

b. Install 74 m^2 (800 $ft.^2$) of new ceiling in curing area and vault control area.

c. Relocate or remove 21 existing doors and install 7 new doors.

d. Install 69 m (225 ft.) of new stud walls.

e. Seal existing walls (above ceiling and below second floor).

f. Remove 74 m^2 (800 ft^2) of existing grid ceiling.

g. Install 3 cm (1-1/4in.) soft water cooling supply system to curing furnaces.

h. Modify the existing heating and ventilation system.

i. Provide and install Helium and Argon manifold, dual flowmeter and tubing to each work station.

j. Provide and install Helium 5% Hydrogen manifold, single flowmeter and tubing to each work station.

k. Provide and install 2.8 m^3/min (100 $ft.^3$/min) air compressor, drier, filter, pressure regulator, air lines and storage tank for instrument air.

l. Provide and install 0.9 x 4.6 m (3 x 15 ft.) exhaust hood and 3.1 m x 15 cm x 20 cm (10 ft. x 6 in. x 8 in) acid tank.

m. Provide and install louvers and exhaust fans to vent curing room.

n. Modify the electrical system.

2. DESCRIPTION OF THE EXISTING ENVIRONMENT:

The proposed project will be constructed at the Central Facilities Area (CFA) in the southwestern part of the Idaho National Engineering Laboratory (INEL), in the north-central part of the semiarid eastern Snake River Plain.

The climate of the region is characterized as a "cool desert" with the vegetation and fauna typical of such a region. During the summer, days are warm, while nights are cool. Winters are cold and dry. The surrounding mountains strongly influence the INEL climate, and cause a southwest wind flow to predominate over most of the Snake River Plain. Nighttime winds are generally out of the northeast.

The most important element of the surface water hydrology near CFA is the Big Lost River which is located 6.4 km (4 mi.) to the northwest. The principal ground water feature is the Snake River Plain Aquifer, which underlies the entire eastern Snake River Plain. The depth to this aquifer, at CFA is approximately 155 m (510 ft.).

No known endangered species permanently inhabit the INEL site. Populations of small mammals, reptiles, and birds are in sizable abundance. Pronghorn antelope and sage grouse are frequently seen throughout the site. Several migratory species of birds, such as larks, doves, hawks, ducks, geese, and eagles commonly pass over or reside at the INEL.

3. POTENTIAL ENVIRONMENTAL IMPACTS:

a. CONSTRUCTION: Since the CF area has already been previously disturbed by the construction of munerous buildings and facilities, the project should not have a significant additional impact on the existing environment.

Solid, nonradioactive waste, primarily in the form of construction debris, will be generated. Such waste will be disposed in accordance with MD-8, Section 6.39 and MD-6, Section 11.12.

A short-term impact will occur during construction involving the cut-off of water and electrical services for a short period of time to allow for new utility installation into the existing lines. Noise levels will increase during the construction period which may be distracting to some of the nearby offices. However, noise levels will not be of a hazardous nature.

b. OPERATION: This proposal will not alter the essential features of water and air pollution control at the INEL. Sanitary liquid and sewage waste will be generated after construction is completed. Sanitary liquid waste will be disposed in existing sewage systems in accordance with MD-6, Sections 11.22 and 8.12. The project will not add significantly to the various existing disposal and utility systems in CFA.

A cleaning area will be installed in the laboratory to handle various toxic liquid waste, (dilute acids, organics), that may be used. This waste will flow into a toxic storage tank for processing and disposal. Any chemical effluents will be disposed in accordance with MD-6, Section 11.22 and MD-8, Section 6.30. Hoods will be required where welding and certain chemical techniques are performed, to assure occupational safety from airborne particulates and gases. Inert gases, such as argon,helium and hydrogen, will also be utilized in the laboratory. If such activities are expected to produce significant amounts of airborne effluents, control devices will be installed. All liquid or airborne effluents will be in compliance with State administered EPA guidelines.

c. SITE RESTORATION: Upon completion of the laboratory modification, the immediate area surrounding the structure will be restored to as near as possible to its prior state.

d. CUMULATIVE AND LONG-TERM ENVIRONMENTAL EFFECTS: It is anticipated that no cumulative or long-term environmental impacts will result from this project. There should be no significant irretrievable or irreversible commitments of natural resources involved in the project. Any equipment that is still needed or can be utilized after the laboratory is no longer in operation could be salvaged for use elsewhere.

4. COORDINATION WITH FEDERAL, STATE, REGIONAL OR LOCAL PLANS:

There are no known conflicts with Federal, state, regional, or local plans and programs.

5. ANTICIPATED BENEFITS AND ALTERNATIVES:

a. BENEFITS: The completion of this $302,000 project would provide laboratory space to consolidate, upgrade, and expand Instrumentation and Control Laboratories at the INEL. The modifications are designed to solve immediate laboratory needs in the quickest and most efficient manner.

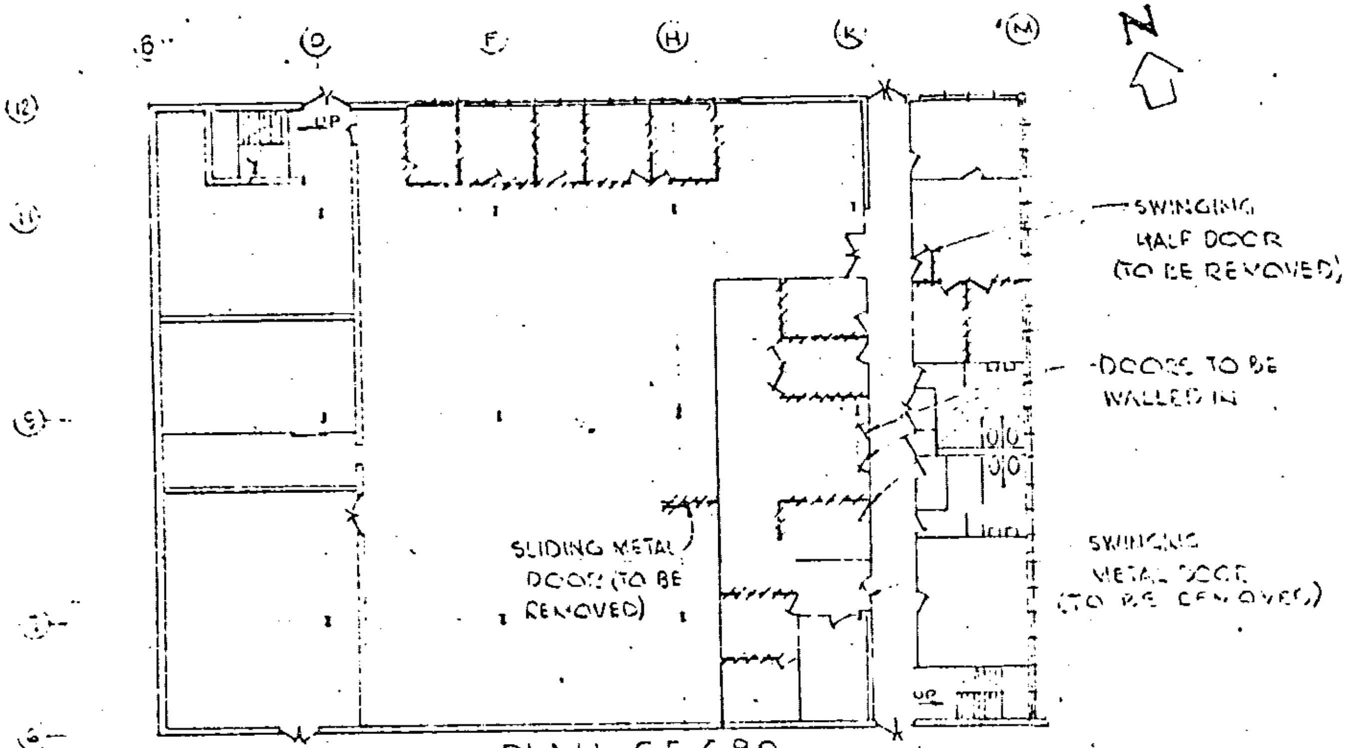
b. ALTERNATIVES: Alternatives for the proposed project are as follows:

1. Alternative design modifications

2. Alternative laboratory site

3. No action alternative

Existing laboratory facilities are inadequate, and the present design specifications meet the exact needs and requisites for the instrumentation assembly area. Alternative laboratory sites are not as well equipped for modification and expansion for an instrumentation laboratory. The no action alternative would hinder the expansion and improvements for development of adequate instrumentation equipment. Therefore, the proposed project is the most practical and feasible choice.



PLAN- CF-689

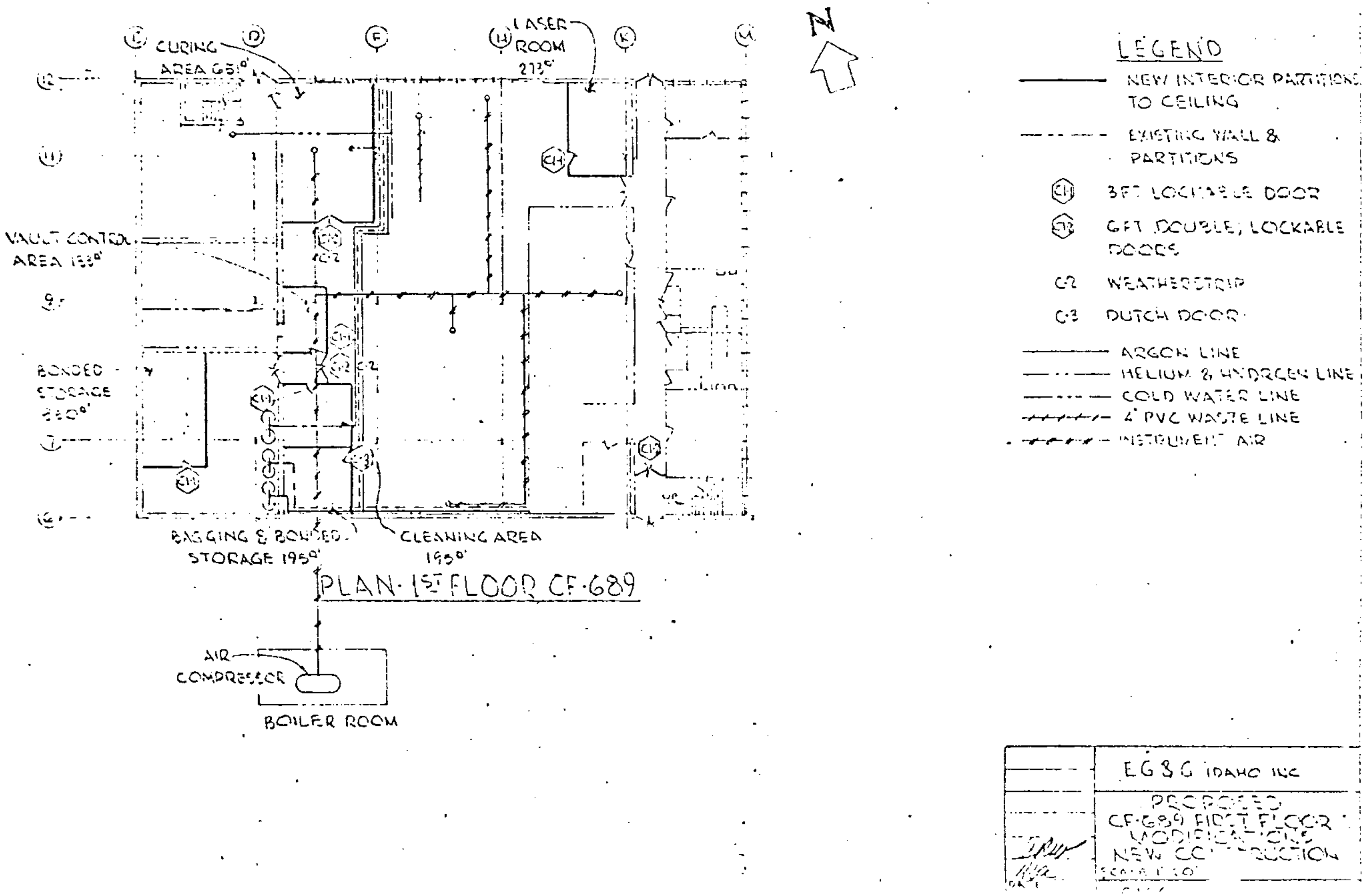
LEGEND

PARTITIONS & WALLS TO BE REMOVED

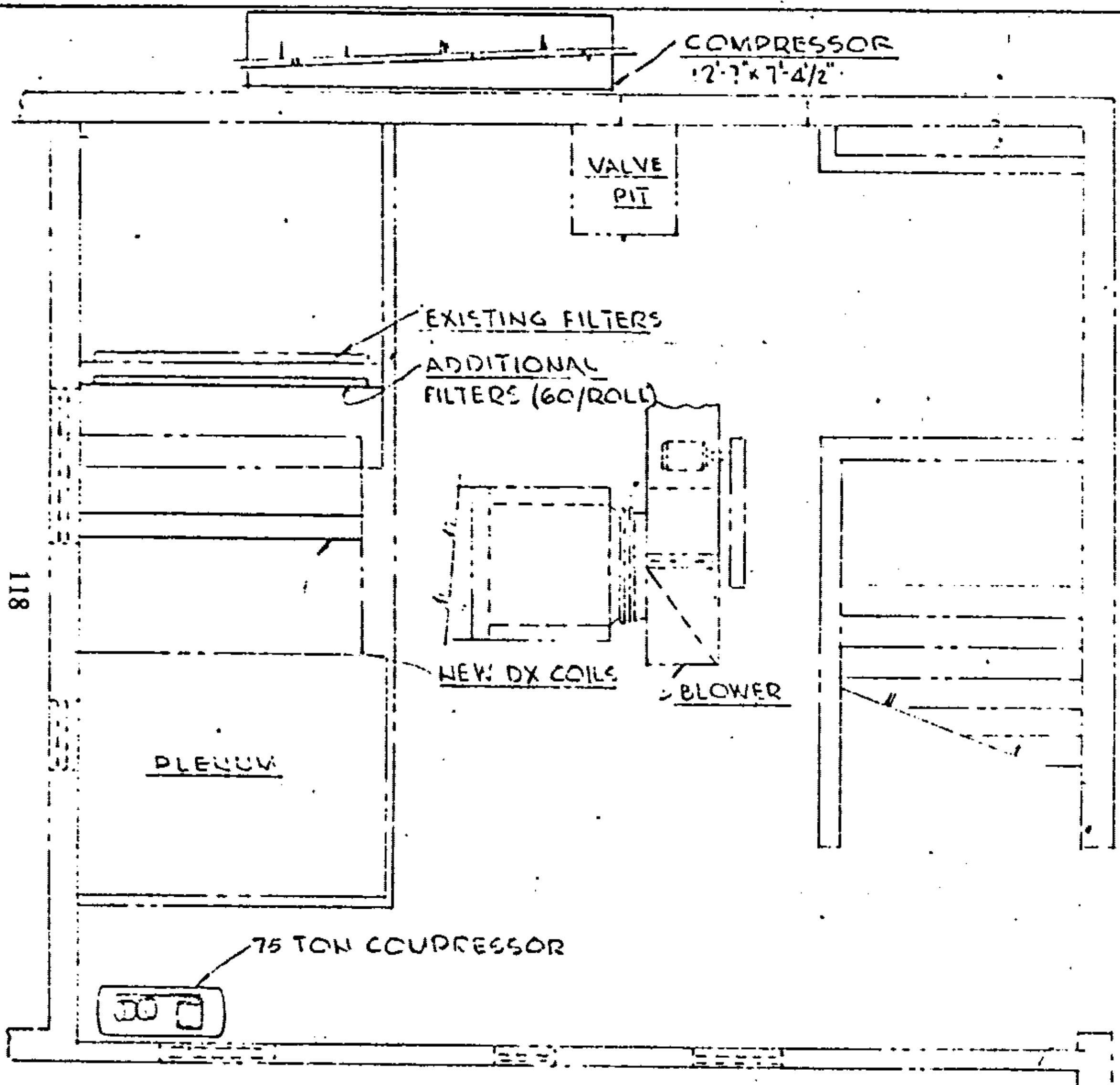
EXISTING PARTITIONS & WALLS TO REMAIN

EG&G IDAHO INC

PROPOSED CF-689 FIRST FLOOR MODIFI[illegible]IONS DEM[illegible]ON



CURING AREA 651°
LASER ROOM 273°
VAULT CONTROL AREA 133°
BONDED STORAGE 380°
BAGGING & BONDED STORAGE 195°
CLEANING AREA 195°
PLAN · 1ST FLOOR CF·689
AIR COMPRESSOR
BOILER ROOM
N
LEGEND
NEW INTERIOR PARTITIONS TO CEILING
EXISTING WALL & PARTITIONS
3FT LOCKABLE DOOR
6FT DOUBLE, LOCKABLE DOORS
C·2 WEATHERSTRIP
C·3 DUTCH DOOR
ARGON LINE
HELIUM & HYDROGEN LINE
COLD WATER LINE
4" PVC WASTE LINE
INSTRUMENT AIR
EG&G IDAHO INC
PROPOSED CF·689 FIRST FLOOR MODIFICATIONS NEW CONSTRUCTION

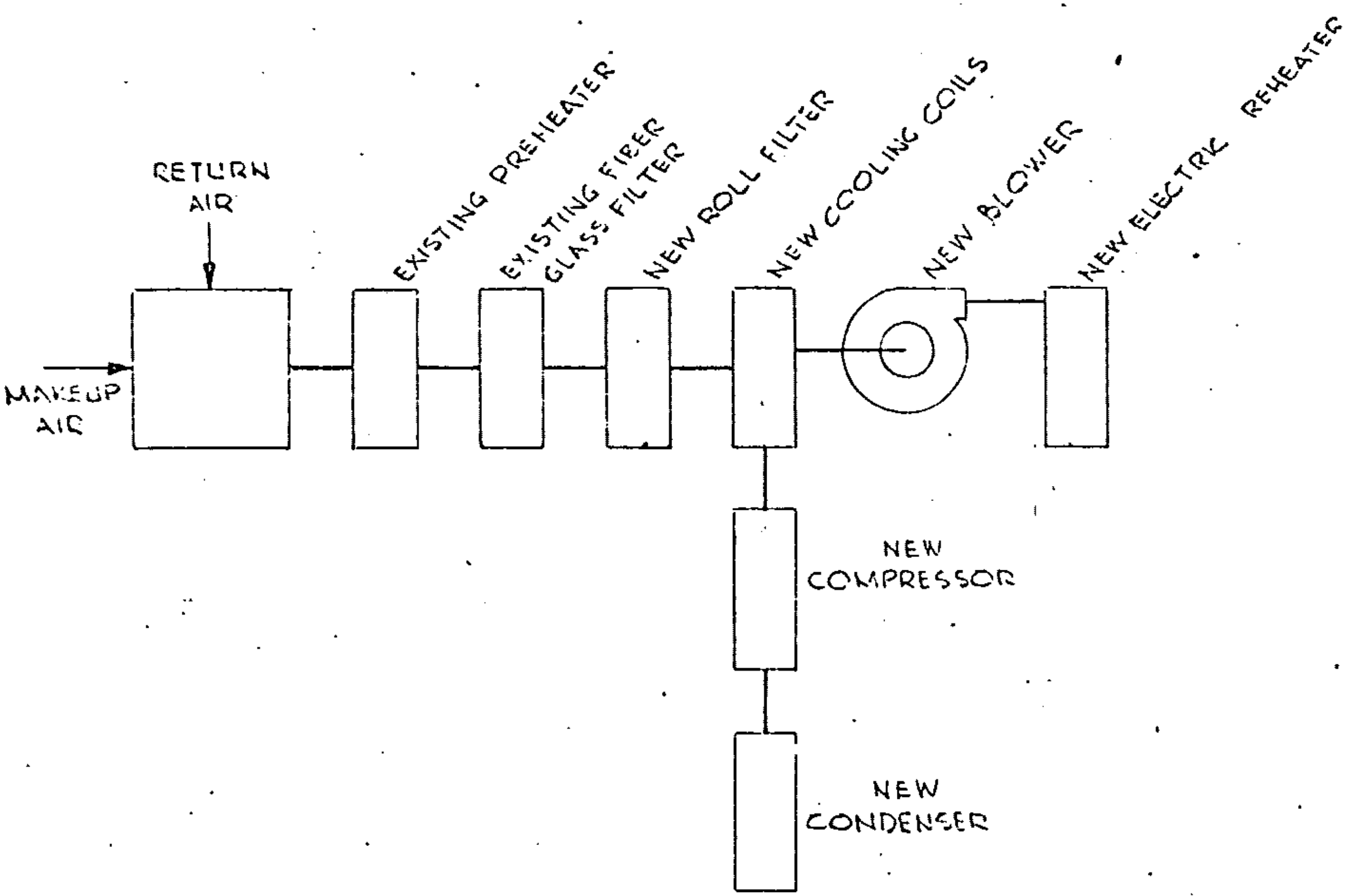


CF-689-FLOOR PLAN-MECH. EQUIP. RM.

SCALE 1/4"=1'-0"

EG&G IDAHO INC.

PROPOSED CF-689 FIRST FLOOR MODIFIC... N NEW CONS... TION



HJW	EG & G IDAHO INC.
	PROPOSED CF-689 FIRST FLOOR MODIFICATION NEW CONSTRUCTION
DATE 7/6/77	SK-4

Attachment 16

Subject:	Environmental Assessment, CF-671 Steam Line Replacement.
Date:	August 4, 1977
Content:	Solid, nonradioactive waste in the form of construction debris was disposed to CFA Landfill II (see Section 3.b).

ENVIRONMENTAL ASSESSMENT

CF-671 STEAM LINE REPLACEMENT

Revised by: T. G. Hedahl
Date Revised: August 4, 1977

TITLE: CF-671 Steam Line Replacement

1. DESCRIPTION OF THE PROPOSED ACTION:

This project consists of the design, demolition, installation and construction necessary to replace the underground steam and condensate lines at Central Facilities Area (CFA) from Boiler House, CF-671 to the Craft Shop, CF-654 and also to Warehouse CF-601. No changes in line sizes will be made since steam quantities will remain the same. Pipe installation shall be in straight runs with no expansion loops, and existing manholes will be used. Expansion couplings shall be installed at each manhole. A dripleg and trap shall be installed between the steam and condensate lines at the low point of the steam line at CF-671. Lines shall be insulated as appropriate.

It is also necessary to relocate all or part of 76 m (250 ft.) of fuel line due to its close proximity to existing condensate and steam lines.

Specifically the following actions constitute this proposal.

(1) Steam supply line and condensate return line to building CF-654 will be uncovered and removed. A new 15 cm (6 in.) steam line and 7.6 cm (3 in.) condensate return line, both made of Schedule 80 black steel pipe, will be routed to building CF-654, utilizing the existing manholes and encasement below the street and tracks, in the following manner:

Pipe will be installed in straight runs from manhole to manhole (no expansion loops).

Pipe will be anchored at the manhole at the upstream end and allowed to travel freely at the downstream end.

Expansion couplings will be provided at each manhole to accommodate thermal expansion.

Piping outside the manholes will be encased in "Gilsonite" or similar underground thermal insulation.

A 3.8 cm (1 1/2 in.) dripleg and 1.9 cm(3/4 in.) trap will be installed between steam and condensate lines at each manhole.

Exposed piping in manholes will be insulated with calcium silicate pipe insulation [approx. 7.6 cm (3 in.) thick on steam line and 3.8 cm (1 1/2 in.) thick on condensate return].

A 3.8 cm (1 1/2 in.) dripleg and 1.9 cm(3/4 in.) trap will be installed between the steam and condensate lines at the low point of the steam line(building exit CF-671).

(2) Steam and condensate return lines to building CF-601 will be uncovered and removed. A new 20 cm (8 in.) steam line and 7.6 cm (3 in.) condensate return line.both made of Schedule 80 black steel pipe, will be routed to a convenient point of connection, above grade, to the existing building's steam and condensate lines as follows:

Pipe will follow the same route as the removed piping.

Underground piping will be encased in "Gilsonite" or similar underground insulation.

A 3.8 cm (1 1/2 in.) dripleg with 1.9 cm (3/4 in.) trap will be installed at the low point of the steam line (building exit CF-671).

(3) Approximately 76 cm (250 ft.) of 10 cm (4 in.) fuel oil line, runs parallel with the existing steam and condensate lines. Although this line does not require replacement, it is necessary to relocate all or part of the line in order to replace the steam and condensate piping.

2. DESCRIPTION OF THE EXISTING ENVIRONMENT:

The proposed project will be constructed at the Central Facilities Area (CFA) in the southwestern part of the Idaho National Engineering Laboratory (INEL), in the north-central part of the semiarid eastern Snake River Plain.

The climate of the region is characterized as a "cool desert" with the vegetation and fauna typical of such a region. During the summer, days are warm, while nights are cool. Winters are cold and dry. The surrounding mountains strongly influence the INEL climate, and cause a southwest wind flow to predominate over most of the Snake River Plain. Nighttime winds are generally out of the northeast.

The most important element of the surface water hydrology near CFA is the Big Lost River which is located 6.4 km (4 mi.) to the northwest. The principal ground water feature is the Snake River Plain Aquifer, which underlies the entire eastern Snake River Plain. The depth to this aquifer, at CFA, is approximately 155 m (510 ft.).

No known endangered species permanently inhabit the INEL site. Populations of small mammals, reptiles, and birds are in sizable abundance. Pronghorn antelope and sage grouse are frequently seen throughout the site. Several migratory species of birds, such as larks, doves, hawks, ducks, geese, and eagles commonly pass over or reside at the INEL.

3. POTENTIAL ENVIRONMENTAL IMPACTS:

a. CONSTRUCTION: The construction of this proposed project will occur in an area that has been previously disturbed, and thus will not produce a significant additional impact on the existing environment.

Construction activities will involve soil excavation and compaction for the steam lines installation. Solid nonradioactive waste, primarily in the form of construction debris, will be generated. Such waste will be disposed of according to MD-8, Section 6.39 and MD-6, Section 11.12.

A short-term impact may occur during construction involving the cut-off of utility services for a short period of time to allow for new steam line installation into the existing lines. Dust will also arise from the excavation and construction activities. However, these impacts are only temporary and should not be of any environmental significance in the CF area. Noise levels will increase during the construction period which may be distracting to some of the nearby offices. However, noise levels will not be of a hazardous nature. Temporary blocking of traffic on Nevada Street may also occur occasionally from construction vehicles and equipment.

b. OPERATION: This proposal will not alter the essential features of water and air pollution control at the INEL under normal operations. The operation of this project will not in itself generate any waste.

c. SITE RESTORATION: Upon the completion of the utility installation, the immediate area surrounding the excavation areas will be restored to as near as possible to its prior state.

d. CUMULATIVE AND LONG-TERM ENVIRONMENTAL EFFECTS: It is anticipated that this proposed project will not produce any cumulative or long-term environmental effects. Implementation of this proposal will eliminate leakage and minimize heat loss, thereby reducing fuel consumption and thus conserving energy. There should be no significant irretrievable or irreversible commitments of natural resources involved in the project.

4. COORDINATION WITH FEDERAL, STATE, REGIONAL OR LOCAL PLANS:

There are no known conflicts with Federal, state, regional, or local plans and programs.

The proposal is compatible with Federal Energy Conservation programs to reduce fossil fuel consumption by upgrading and insulating energy transfer systems.

5. ANTICIPATED BENEFITS AND ALTERNATIVES:

a. BENEFITS: The completion of this $74,000 proposed project will provide new steam and condensate lines at Central Facilities Area from the boiler house (CF-671) to CF-654 and CF-601. The existing lines are approximately 25 years old and deteriorating as evidenced by other lines of the same vintage and indicated by the loss of heat from these buried lines. The new insulated steam and condensate lines will improve heat retainment, thereby reducing fuel consumption and thus conserving energy. In addition, these new lines will improve the heating in the craft shop and warehouses.

b. ALTERNATIVES: Alternatives to the project are as follows:

(1) Alternative design modifications
(2) Alternative heating systems
(3) No action alternative

Alternative designs for the steam transfer lines would be more expensive and would require additional excavation and site disruption at CFA. Various heating systems exist (i.e. fuel oil and electricity), but major modifications would be required to convert to another system at these buildings. The no action alternative would allow for continued heat and energy loss through the existing lines. Therefore, the proposed project appears to be the most practical and feasible choice.